NOVEMBER 1987 **$2.00 U.S.**/$2.50 CAN.

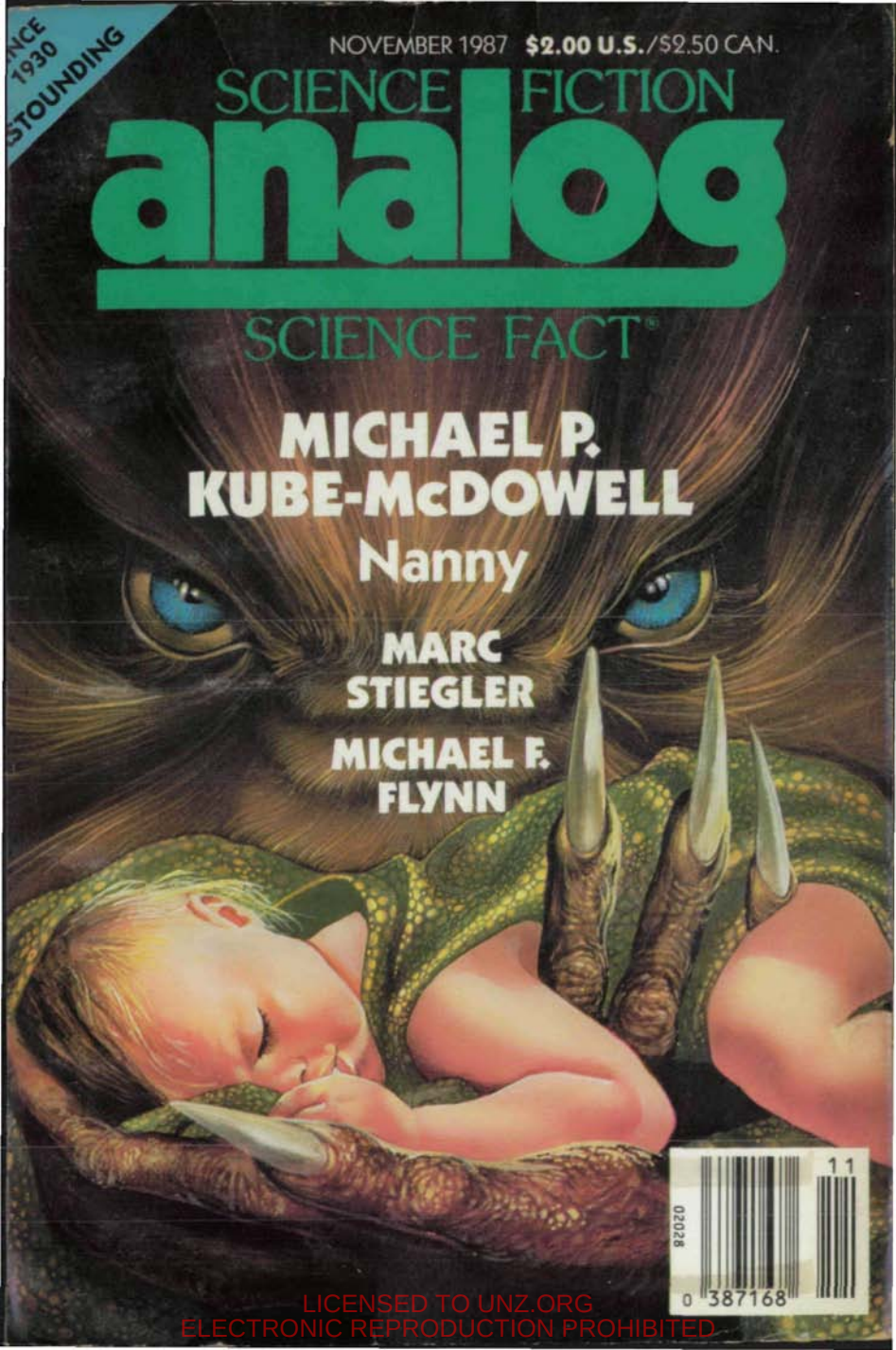
NCE 1930 STOUNDING

SCIENCE FICTION analog SCIENCE FACT®

MICHAEL P. KUBE-McDOWELL
Nanny

MARC STIEGLER

MICHAEL F. FLYNN



02028 11
0 387168

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

STUNNING...BREATHTAKING...
VIVID...THOUGHT-PROVOKING...

THE SHORE OF WOMEN

A love story
of the future
by
PAMELA
SARGENT
author of
Venus of Dreams.

"One of the few perfect
novels of the 1980's."
—Orson Scott Card,
Fantasy and Science Fiction

BANTAM
SPECTRA
NEW YORK • TORONTO • LONDON • SYDNEY • AUCKLAND

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The heroes of the far future are the daring captains who cross the galaxy with the rarest cargoes of a hundred worlds.

The ***Star Traders*** game brings you the excitement of travel and trade, as two to six players race for wealth. In the end, only one player will be named the Imperial Trader.

Skill and planning are needed to locate your stations. But the "Trader's Luck" cards make every trip a chancy one. You can lose a cargo — or gain prestige and Imperial favor!

The *Isaac Asimov Presents:* ***Star Traders*** game is available at your favorite toy, hobby or book store for $19.95.

If your local store doesn't carry ***Star Traders*** you can order it by mail. Add $1.55 for postage and handling. Texas residents please add $1.44 sales tax. Please allow four weeks for delivery. Our catalog is free.

STEVE JACKSON GAMES
Box 18957-J Austin, TX 78760

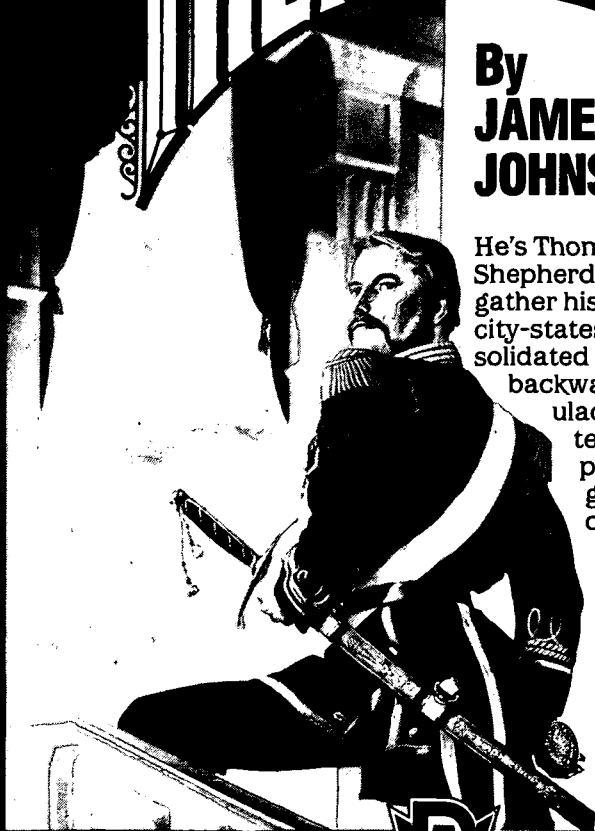
Star Traders is a trademark of Steve Jackson Games Incorporated. *Isaac Asimov Presents* is a trademark of Davis Publications, Inc., used under license. All rights reserved.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

He could change the destiny of worlds... or destroy them—and himself—trying!

TREKMASTER

By JAMES B. JOHNSON



He's Thomas Jefferson Shepherd, struggling to gather his planet of warring city-states under one consolidated rule, dragging a backward provincial populace into an age of technology to win a place in the Intergalactic Federation of Planets. But powerful forces will use any means to defeat him—including the total obliteration of T.J.'s planet.

$3.50

Distributed by NAL

DAW SCIENCE FICTION

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

analog

Vol. CVII No. 11
November 1987

Next Issue on Sale
October 6, 1987

$19.50 per year in U.S.A.
$2.00 per copy in U.S.A.

Serial

IN THE COUNTRY OF THE BLIND, Michael F. Flynn, Conclusion ____ 136

Novelettes

NANNY, Michael P. Kube-McDowell ____ 14
THE THIRD ALTERNATIVE, Marc Stiegler ____ 76

Science Fact

A MEMOIR OF NUCLEAR WINTER, Tony Rothman ____ 53

Short Stories

JUST ANOTHER DAY AT THE WEATHER SERVICE, Elizabeth Moon ____ 74
NEITHER RAIN NOR SLEET NOR WEIRDNESS, Jerry Oltion ____ 112

Probability Zero

PROALLOGNOSTICATION, Andrew Giesler ____ 110

Reader's Departments

THE EDITOR'S PAGE ____ 4
IN TIMES TO COME ____ 52
ON GAMING, Matthew J. Costello ____ 109
THE ALTERNATE VIEW, G. Harry Stine ____ 127
THE REFERENCE LIBRARY, Tom Easton ____ 131
BRASS TACKS ____ 186
THE ANALOG CALENDAR OF UPCOMING EVENTS ____ 192

Cover by Todd Hamilton

Joel Davis, President

William F. Battista, Publisher

Stanley Schmidt
Editor

Tina Lee
Assistant Editor

Indicia on Page 6

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Editorial

GREAT OAKS FROM LITTLE ATOMS

Stanley Schmidt

When I was teaching science fiction in college, I found that I could usually catch students (and colleagues) off guard with the question, "Is it possible to construct a computer with all the capability of the human brain, but occupying a space only so big?" To define "so big," I used my hands to indicate a region of space the size of a human head.

A typical reply was, "Well, of course I don't actually *know* what future technology will be able to achieve, but I seriously doubt it."

To which I countered, "And what did you use to reach that conclusion?"

The answer, of course, is "a computer with all the capability of the human brain, but occupying a space only so big." The human brain *is* such a computer, and the fact that it exists clearly proves that such things are possible. The fact that human beings have not yet learned to make them by laboratory or factory methods is quite irrelevant. Unless there is something more fundamentally special about human life than most scientists have found any reason to believe, the fact that nature did it implies that we should be able to learn to do it, too.

In his recent book, *Engines of Creation* (Anchor Press/Doubleday, Garden City, 1986, $17.95), K. Eric Drexler takes that reasoning a big step further: the fact that nature made brains *or anything else* means that it can be done *at*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

least that well. If we put our minds to it, we might be able to do it even better—maybe even a *lot* better. Nature, working by small evolutionary modifications of what it's already done, is pretty much stuck with the basic materials it has used for life since the beginning. Human engineers are not; they already use things like stainless steel and doped semiconductors. We already know that the characteristic processes of life are carried out by "molecular machines"—molecules that act as very tiny wrenches and keys and so forth—building complex molecules from simpler components. You can't make brain-sized computers by using tools people can handle directly; that would be like trying to pick your teeth with a bulldozer. You *can* build them using molecule-sized "assemblers" to build them up from smaller parts; life proves that by doing it. There's no inherent reason why humans can't build molecular assemblers from materials other than those on which terrestrial life is based. Such assemblers would be able to build just about anything you want, including things with properties never evolved by nature, by literally putting atoms together like building blocks. Many of nature's creations may prove to be only crude approximations of what *can* be done.

That's typical of the kind of penetrating and stimulating insight with which Drexler's book is packed. I'm not often willing to devote so much of an editorial to what amounts to a book review, but once in a while a book comes along which really *needs* to be read by anyone seriously interested in the future, and which belongs on the most accessible shelf of the working library of anyone who wants to write real science fiction. This is one of them. It is immensely rich in ideas which cry out to be explored in the "thought experiments" of stories—not only because those stories should make fascinating reading, but because we're all going to need the results of the "experiments" a lot sooner than you may think.

Despite its title, *Engines of Creation* will not be popular with "creation scientists." For one thing, certain people (you know who) will consider it unspeakably arrogant that human beings should even consider attempting to improve on nature. For another, a theme that runs strongly through the entire book is that everything evolves: organisms through the replication, mutation, and competitive selection of genes; social institutions and technologies through the replication, mutation, and competitive selection of memes. In general, things based on memes tend to evolve faster than those based on genes. Since both genes and memes are units of information, systems that process information faster will tend to evolve faster than those that handle it more slowly. Therefore the acceleration of change we have experienced in recent decades is going to keep getting faster—a *lot* faster—for several reasons. Molecular engineering, or nanotechnology, is one of them; but so are artificial intelligence and the fact (ignored in too many attempts at technological forecasting) that all fields of knowledge are moving for-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ward together—and often pull each other along.

We already have computers that process data, at least of certain kinds, far faster than human brains. When *molecular*-scale computers are built (and yes, they do appear to be possible), signals will have so little distance to travel that processing times will be reduced yet again, by very large factors. Moreover, computers are learning to do analyses of such sophistication that more and more people are willing to call them "artificial intelligence." Therefore we will increasingly have computers (including molecular computers) able to do much of the work of designing their own successors, and do it *much* faster than unaided humans. Work that would take an engineer alone hundreds of years (which he might not have) might take such machines mere minutes (or even

STANLEY SCHMIDT ..... Editor
TINA LEE ..... Assistant Editor
EMY ETERNO ..... Editorial Assistant
RALPH RUBINO ..... Corporate Art Director
TERRI CZECZKO ..... Associate Art Director
ANTHONY BARI ..... Junior Designer
DENNIS DOYLE ..... Junior Designer
CAROLE DIXON ..... Production Manager
ROBERT J. ALLEN ..... Production Assistant
CYNTHIA MANSON ..... Director, Subsidiary Rights
FLORENCE B. EICHIN ..... Manager, Contracts & Permissions
VEENA RAGHAVAN ..... Public Relations Promotions Manager
LOUISE MUGAR ..... Circulation Director/ Retail Marketing
JAMES R. CAULKINS .... Circulation Planning Director
LAURA GUTH ..... Circulation Director/ Subscriptions
CHRIS DORBANDT ... Newsstand Operations Manager
RISA LUND ..... Advertising Services Manager

First issue of *Astounding* January 1930. ©

JOEL DAVIS
President

FRED EDINGER
Senior Vice President
Finance

PAULA COLLINS
Senior Vice President
Circulation

CARL BARTEE
Vice President
Manufacturing

STEPHEN POLICOFF
Assistant Vice President

Published continuously since 1930.

WILLIAM F. BATTISTA
Publisher

ADVERTISING OFFICES NEW YORK
(212) 557-9100

Analog Science Fiction/Science Fact (Astounding) is published 13 times annually by Davis Publications; Inc. at $2.00 a copy in U.S.A., $2.50 in Canada. Annual subscription $19.50 in the U.S.A. and possessions, in all other countries, $24.20 payable in advance in U.S. funds. First copy of new subscription will be mailed within eight weeks of receipt of order. When reporting change of address allow 6 to 8 weeks and give new address as well as the old address as it appears on the last label. Second-class postage paid at New York, NY, and at additional mailing office. Canadian 3rd class postage paid at Windsor, Ontario.

© 1987 by Davis Publications, Inc., all rights reserved. Protection secured under the Universal Copyright Convention. Reproduction or use of editorial or pictorial content in any manner without express permission is prohibited. All stories in this magazine are fiction. No actual persons are designated by name or character. Any similarity is coincidental. Printed in U.S.A. All submissions must be accompanied by stamped self-addressed envelope, the publisher assumes no responsibility for unsolicited manuscripts or artwork.

POSTMASTER: SEND FORM 3579 to ANALOG SCIENCE FICTION/SCIENCE FACT, (ASTOUNDING) P.O. BOX 1936, MARION, OH 43306
IN CANADA RETURN TO 628 MONMOUTH ROAD, WINDSOR, ONTARIO N8Y 3L1
Editorial and Advertising: Analog Science Fiction/Science Fact, 380 Lexington Avenue, New York, NY 10017
Subscriptions: Analog Science Fiction/Science Fact, P.O. Box 1936, Marion, OH 43306 ISSN 0161-2328
Call (614) 383-3141 for problems with your subscription.

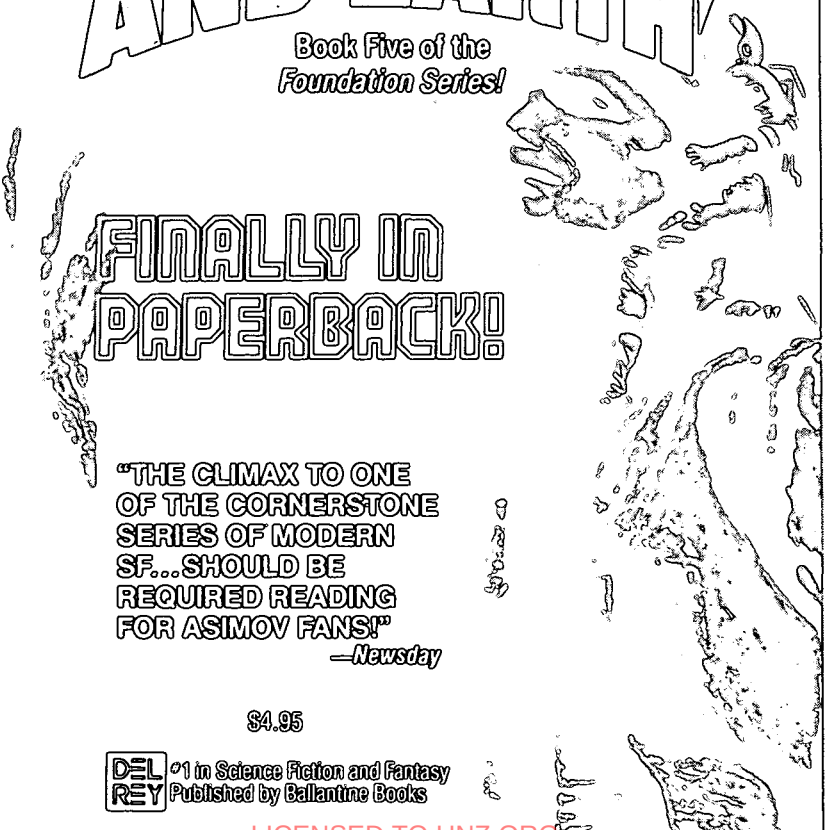
LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

NEW YORK TIMES BESTSELLER—

ISAAC ASIMOV

FOUNDATION AND EARTH

Book Five of the
Foundation Series!



FINALLY IN PAPERBACK!

"THE CLIMAX TO ONE OF THE CORNERSTONE SERIES OF MODERN SF...SHOULD BE REQUIRED READING FOR ASIMOV FANS!"
—*Newsday*

$4.95

DEL REY #1 in Science Fiction and Fantasy
Published by Ballantine Books

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

less). Furthermore, machines, like people, can collaborate and thereby work faster than one alone. And humans themselves will learn to collaborate much better, by making far more efficient use of information, through such innovations as "hypertext" systems, which allow everybody to publish and make all kinds of cross-references and criticisms immediately and permanently accessible.

Given molecular assemblers coupled with intelligence multipliers like artificial intelligence and hypertext, a *lot* is likely to happen *very* fast. One of the main reasons I am advising science fiction writers to read Drexler's book is to shock them into seeing just how quaintly timid most of their projections really are—and where they *should* be working, if they are going to do science fiction's job of scouting ahead of reality. Some old science fiction standbys are here, but with step-by-step reasoning to show why they're likely to be here a lot sooner than stories have usually imagined. The synthesizer that "grows" just about anything to order, for instance—several stories have used it, but just about always in the very far future. Even then, when stories mention such details at all, they typically have starship engines being manufactured from bulk metal. More likely they'll be grown, from active materials not yet invented—as described in one of the uncommonly vivid word pictures Drexler uses instead of illustrations. Another old standby, the end of essentially all diseases including "old age," in Drexler's vision is achieved by molecular "cell repair machines"—but there is reason to suspect that the first beneficiaries of such abilities are already alive. *You* may be one of them.

Remember Greg Bear's "Blood Music," published here (and winning both Nebula and Hugo awards) in 1983? At the time, I described it as "a pretty wild story by any standards," but it doesn't look so wild anymore, if you really think about the possibilities. Remember Vernor Vinge's *Marooned In Real Time*, which we serialized just last year? The month before it started, I described it as "the ultimate murder mystery, involving one of the most strikingly original concepts I've seen in a long time." That was the Singularity, the abrupt transformation in which most of mankind seemingly vanished as the curves of technological change went asymptotically vertical. When I first read *Marooned In Real Time*, I thought, "Yes! Why hasn't anybody thought of this before?" When I read *Engines of Creation* (which was published quite close to the same time), I realized that although Drexler didn't use the same terminology as Vinge, what he was describing was something very much like the Singularity—but sooner. Then I remembered Vernor's afterword, in which he apologized for being probably too conservative, and concluded, "If we don't have that general war, then it's *you*, not Della and Wil, who will understand the Singularity in the only possible way—by living through it."

What was that about a general war? When things change that fast, there are going to be serious problems of adjust-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE LEOPARD'S DAUGHTER

Lee Killough

From Hugo Award-nominee Lee Killough comes a brilliant new novel with all the beauty and savagery of the jungle itself.

Her mother is a princess. Her father a leopard. Her allies are the wild hunting beasts of the night. And when the fabled city of Yagana vanishes in a clap of thunder, an ancient prophecy decrees that it is *she* who must save its people.

"Killough has become an author whose every new book is a treat." —*Science Fiction Chronicle*

Cover art by Michael Herring
0-445-20522-9/$2.95
(In Canada:0-445-20523-7/$3.95)

Questar

Science Fiction/Science Fantasy

© Popular Library 1987

THE WIZARD OF 4TH STREET

Simon Hawke

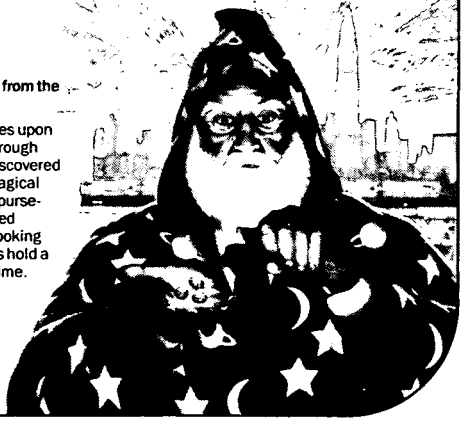
A high fantasy look at 23rd-century Manhattan, from the popular author of the *Timewars* series.

In the 23rd century, the traditional energy sources upon which technology depends have disappeared through depletion and disaster. But magic has been rediscovered and sorcerers have been paid to maintain the magical energy system. So when a student wizard and a purse-snatching orphan disappear with some enchanted stones, they have every sorcerer in the city out looking for them. Little do they know that those hot rocks hold a mysterious spell that goes back to the dawn of time.

Cover art by Dave Mattingly
0-445-20302-1/$2.95
(In Canada: 0-445-20303-X/$3.95)

POPULAR LIBRARY

AT BOOKSTORES EVERYWHERE



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ment—and not a lot of time to fumble for solutions. Any new technology can be used in a great many ways, ranging from highly beneficial to highly destructive. The more powerful the technology, the greater the potential for *either* benefit or destruction. The technologies Drexler describes are more potent than any in our past experience. They will pose threats at least as great as those of nuclear energy—and promises far beyond anything we've known before. Above all, they will offer *choices*—and choices of this magnitude cannot be made lightly or haphazardly.

I must emphasize two final points. The first concerns the nature of Drexler's speculations. I have often said that science fiction tries to model possible futures on the basis of speculations which can be considered either "extrapolations" or "innovations." *Extrapolations* use extensions beyond the present state of the art, based strictly and rigorously on well established principles. We don't know exactly how to do them yet, but we do know they are possible. *Innovations* are fundamentally new principles, such as faster-than-light drives, which we can't be sure nobody will ever discover, but which we have no reason to expect. Some of them *may* turn out to be possible (relativity and quantum mechanics would have been in this category a hundred years ago), but we can't base predictions on them and for most purposes (at least outside fiction) we would be best advised to treat them as non-possibilities. Eric Drexler is quite careful with his definition of limits of possibility, and his projections are pure extrapolations. Some of them may sound more fantastic than many science-fictional innovations, but they are very real possibilities. They are things that *can be done* by those who dare—and cannot be wished away by those who find them disturbing.

My other closing point is that the new potentials really do offer (and demand) *choices*. It's true that some of the things they can do are terrifying, and Drexler pulls no punches in spelling those out. But don't forget the other side of the coin: some of the things they can do are exhilarating, provided we can find ways to protect ourselves against the dangers—and he has plenty of constructive suggestions on how to do that, too. The experimenters-with-words who explore all these possibilities in stories will need to explore both dangers and rewards. Problems are the foundations of stories, but *solutions* are usually what make them worthwhile and memorable. It's relatively easy to imagine ways the future can be horrible (though many writers do even that less imaginatively and convincingly than Drexler). It's much harder—but much more useful, rewarding, and important—to imagine ways it can be made *better*.

Find *Engines of Creation*. If it's not on the shelves at your local bookstore or library, order it. If necessary, make Doubleday reprint it.

Read it. Enjoy it. Be scared by the dangers—but not daunted, for despair does not solve problems. Be shamed,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The Rat is Back...and the Army's Got Him

HARRY HARRISON'S

THE STAINLESS STEEL RAT GETS DRAFTED

The biggest, most exciting Rat adventure yet.

A BANTAM-SPECTRA HARDCOVER

BANTAM

NEW YORK • TORONTO • LONDON • SYDNEY • AUCKLAND

SPECTRA

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

if you must, by your own past shortsightedness—but not too much, for shame wastes energy on the past that can be better spent on the future.

Be inspired.■

The trade paperback copy of Engines of Creation *is expected in the fall of 1987.*

JAMES TIPTREE, JR./RACCOONA SHELDON/ALICE SHELDON 1915-1987

The March 1968 issue of this magazine carried a story called "Birth of a Salesman," which also marked the debut of a new writer who quickly established a reputation as one of the best and most original short story writers in this field. Stories by "James Tiptree, Jr." began to appear frequently in many places; they were often nominated for, and several times won, Hugos and Nebulas. In 1977 it was revealed that Tiptree was really Alice Sheldon. In that same year she introduced yet another identity, the "Raccoona Sheldon" pseudonym created for stories which seemed too different from Tiptree's, beginning with the Nebula-winning "The Screwfly Solution."

Alice Sheldon was a very private person whose writing career was only one aspect of a very full and remarkably varied life. Sadly, in recent years that life became increasingly difficult for her and her husband, Huntington Sheldon, and ended on May 19, 1987, when she shot first him and then herself in what appears to have been a suicide pact. Relatively few people knew her personally, but she will be missed by many who knew her through her stories and letters.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE START OF

PIERS ANTHONY

VALE OF THE VOLE

First Time in Paperback!

Available Now from AVON BOOKS

$3.95 ($4.95 in Canada)

AVON BOOKS
The Hearst Corporation

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Michael P. Kube-McDowell

NANNY

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Eeehhee—"

The reedy cry which arose from within the darkened bedroom was weak and tentative, but it contained a promising note of real distress.

"Ehaharr—"

One room away, in the apartment's cozy family center, the cry reached the ear of Carii Donovan, a long-limbed raven-haired woman casually attired in a pale blue dayrobe and seated cross-legged in front of the omnicom. She raised her head from the call she was involved in and looked in the direction of the cry.

"Eeehaee—"

Carii sighed and touched the mute button. The image of her talkmate, a pale-skinned woman several years older than herself, vanished from the omnicom's small screen.

"It's all right, darling," Carii called toward the bedroom. "Mommy's still here. You sleep a little longer." She touched the mute button again and lowered her voice as the other woman's face returned to the screen. "Sorry to disappear on you, Q. It sounds like Darla's about to wake up."

"Aren't they so beautiful sleeping?" Quiana Todd cooed. "I could just watch them forever."

Carii smiled wistfully. "Sometimes it seems like that's about all there is to do when she's sleeping."

On the screen, Quiana's expression was touched by concern. "Is something wrong?"

"Oh—no," was Carii's reply. "And yes. Everything's perfect. And everything's all screwed up, all at the same time."

"Want to talk about it?"

"No," Carii said shortly. "If I talk about it I'll just make myself more unhappy. Let's talk about something else. You. Work. Whatever. How are things over there?"

"Busy," Quiana said cheerily, as though that were good news. "We've got five taps open, and four of them are goosing out top-grade ore. Fifty-fives and better."

"That's even better than the site Daniel's working."

"And there's a half-dozen more taps laid out waiting for the first operator that gets free. We could sure use you."

"I could stand being used."

"I'll tell Daniel," Quiana said with a salacious eyebrow flash.

"That's not what I meant."

Quiana smiled. "Be careful, or you're going to start talking about it."

The warning was too late, for Carii's carefully compartmented bitterness had already begun to escape its prison. "I don't care," she snapped. "I'm tired of biting it back. When Daniel told me Rheinchem liked to hire family units for their extraction teams, I naively thought they really meant families. I never dreamed I'd be the only mother in the compound."

"They're probably not too excited about having you laid up with a three-month old, either," Quiana observed.

"Why do you say that?" demanded Carii. "Has my supervisor been complaining?"

"No, Larry hasn't said anything—except what I said, that we could use you. But it's obvious that nobody wins, except Darla. Rheinchem isn't making any money off of bringing you out here, you're not drawing any salary—"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"It just doesn't make any sense. They didn't try to stop us when they found out—didn't hold up the contracts or anything. They just won't do anything to help. No sitters. No day care. Nothing."

"Carii, honey, why should they? Rheinchem didn't knock you up, Daniel did. Besides, no matter what they do somebody's sitting around not producing. Since they'd have to pay a child-care specialist, it might as well be you."

Carii grimaced. "What an awful expression—'knock you up.' When you're about to have your own, I'll bet you don't think of it like that."

Quiana smiled wickedly. "Honey, listening to you, I don't know that I want to have my own."

"Oh, don't think I'm not happy with Darla," Carii hastened to add. "She's delightful—babies really are magic." A smile crept onto her face. "When I'm nursing her sometimes she opens one eye and sort of sneaks a peek at me, and I just melt inside. And she has the most wonderful laugh—"

"So what's the problem?"

"You know what it is—I'm bored silly! I came to Farley's World to work," Carii said. "I've got the same license as Daniel and a year's more experience—"

"Maybe *he* should stay home with Darla, then."

Carii's laugh was brittle. "He'd be even worse at it than I am." A note of despair crept into her voice. "Oh, Q. You just don't know unless you've had to do it. It's like living in a ghost town. Even when there's anyone here who isn't crawling in or out of bed, I don't have anything to talk to them about—"

"It can't be that bad—"

"When I got here I was in the middle of it with everyone. Now I've had four months of solitary and I'm bouncing off the walls. This isn't parenting—it's an endurance test."

"Does Daniel know how you feel?"

Carii loosed a little sigh. "Not really. He doesn't mean to, but he can't quite forgive me for wanting to keep Darla once we knew. We're going to have to stay here an extra year because of this. I can tell he blames me."

"He wanted you to have an abortion? What a rat."

"He never asked me to. He just kind of—withdrew. Like it was my baby, not his."

"That's a hell of an attitude. It's not like you did it alone."

"He doesn't really say anything. It's just something I can tell."

"Even so—"

"If there were even one more mother here—we could trade off, work half-shifts. Or at least keep each other company—"

Quiana looked thoughtful. "Maybe you could get one of the Baesk to sit with Darla. I know a woman over in the Frontier Metals camp that has one looking after her seven year old."

"I can't believe that. Really?" The Baesk were Farley's World's native sentients. Carii knew of them, but had never seen one in person—they were creatures of the valley forests, and Rheinchem's interests were in what lay beneath the bare domehills.

"She says she's just perfect. I think there's a couple of families over in the Resources Unlimited compound that are doing the same thing."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"You never said anything about it before." Just then, a sudden piercing wail proclaimed that Darla was now fully awake.

"I never knew you weren't happy before."

Carii's initial spark of curiosity faded into a vague disquiet. *How could an alien answer that cry and put my child at ease?* she wondered. "I don't think I could do that," Carii said dubiously. "It'd be like leaving her with some kind of wild animal—"

"You could always go over and see for yourself. I'd call Joanne and set it up if you want."

"No," Carii said with a shake of her head. "That's all right. I'll get by."

"Whatever," Quiana said, shrugging. "Sweet, my break's almost over and I haven't gotten to the Personal yet. I've got to sign off."

Darla's cry went up five decibels and fifty hertz. "I guess I've got things to do, too," Carii said. "Call me at lunch?"

"Sure."

Breaking off, Carii rose from the omnicom and started toward the nursery. A few steps from the door, she sniffed the air and sighed resignedly.

"Darla, my sweet, you've done it again," she said aloud to herself. "Will someone explain to me why there's been no advance in baby hygiene since the invention of the disposable diaper?"

The conversation and her complaints stayed on Carii's mind as she changed and dressed her daughter. *It's like I'm the sole spectator at a feeding frenzy,* she thought. For there were fortunes to be made on Farley's World, and she wasn't getting her share.

Farley's World did not belong to Frederik Farley, the free-spirit xenologist who discovered it forty years ago, or even to the Baesk, who had been Farley's interest there. It was an open world, and its considerable mineral riches belonged to anyone who cared to show up with a mining mole and register with the local Dominion representative.

In his enthusiasm over the Baesk, Farley had not even troubled himself to file the finder's claim that would have guaranteed him a cut. Nor did Dominion law require any greater considerations for the Baesk than that they be left alone. With no service load—on other resource planets it averaged three to seven percent—Farley's World was especially attractive. Six companies had installations there, two with larger investments than Rheinchem.

And rogue mining required a sizable investment. Creature comforts counted almost as much as profit participation in recruiting skilled mole operators and hardware techs. Self-interest could make a worker go hard, but it took good food, a soft bed and some companionship to bring him back fresh the next day.

So although Farley's World was a pioneer planet, it was no hardship post. Rheinchem's twelve-hectare worker housing compound rested on ground that had been flamed to bare earth, quicksealed, and fenced. Within the compound were thirty-six two-unit Morris housing mods and two four-story Central Services towers. Six-seat air shuttles operating from the flat roofs of the CS towers ferried workers in speedy

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

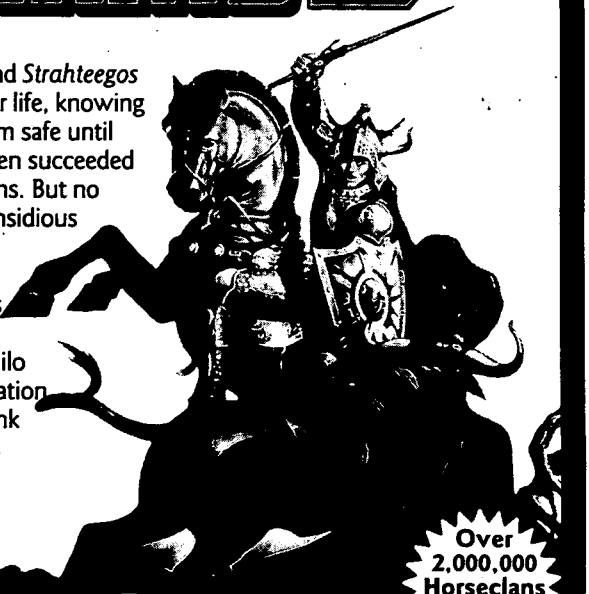
Can even the agents of High Lord Milo save the Kingdom of the Southern Ehleenohee from the evil within?

HORSECLANS #17

ROBERT ADAMS

MADMAN'S ARMY

They had named him Grand *Strahteegos* of Southern Ehleenohee for life, knowing he would keep the kingdom safe until Milo and the Horseclansmen succeeded in conquering the barbarians. But no one had foreseen that an insidious madness would transform Grand *Strahteegos* into an enemy far more dangerous than any invader. Time was fast running out for Milo to save this new Confederation kingdom, driven to the brink of civil war by a madman's cruel decrees...



$3.50

Over 2,000,000 Horseclans now in print

SIGNET SCIENCE FICTION

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

comfort to the Rheinchem extraction sites scattered over the hills.

Except for the isolation of being thirty-eight lights from a major population center, it was not a bad life. Rheinchem paid well—salary plus nine percent on production. And it strove to provide everything its workers had time to enjoy.

Then why does it feel like such a prison, Carii wondered as she bared her right breast for Darla's hungry mouth. *Is there something wrong in me, that I can't be happy and fulfilled being someone's mother, that this isn't enough?*

There were no answers, only the guilt and pain which came with needing to ask the questions. Carii closed her eyes and settled back in her chair and tried to focus on the immediate and physical, the warmth of skin against skin, the familiar suckling and gurgling noises Darla made as she nursed.

But even that effort defeated her, for as Carii sat there cradling Darla in her arms, it seemed somehow that her daughter was drawing the life from her, and would leave her empty, a shell, when she had taken her fill.

There was an ugly expression on Daniel's face when he came through the door that evening, and he was not long in letting Carii know why.

"Want to know what kind of fun I had today? I hit a goddamn granite sill with the mole and snapped the number two impeller," he said, dropping heavily into a chair. "Lost two hours of production, and from the way she was behaving afterward I don't think the tech normed her right."

"Oh, sweetheart—"

"And then he's got the nerve to tell me there's nothing wrong with the tracking, that I read the sensors wrong. Goddamn it, I learned how to read a sill profile when I was twenty."

I learned when I was eighteen, she thought. But it would have been a mistake to say that or anything else just then. She programmed their dinner in silence and then kept Darla as far from her husband as possible.

After dinner, she held her daughter on her lap and read her an old picture book about wild things in a child's bedroom, a story that could mean nothing to the infant but which had a lovely soothing rhythm to its words.

When she was finished and looked up, most of the hard lines had gone out of Daniel's face. With the stub of a privacy earpiece visible in his right ear, he was sitting watching the flickering images of the nightly newsgram piped to Farley's World from home.

"I'm going to put Darla to bed," she said.

"Sounds like a good idea," he grunted.

Daniel made no move to make himself part of the nightly ritual, and Carii did not press him. Smiling a tight smile, she gathered the infant up in her arms and carried her away.

"Sleep easy tonight, my tiny one," she whispered as she tucked the blanket around Darla's prone form in the little bed. "I love you."

Returning to the family center, she saw that the newsgram was nearly over, and settled on the floor near Daniel's feet. She waited until he had removed the earpiece and turned off the screen and then tried to catch his eye.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Daniel—what do you know about the Baesk?"

He looked at her curiously. "Not a hell of a lot. We see them every now and then from our site, watching us from down at the forest edge."

"Have you ever met one—talked to one?"

"When would I cross paths with a Baesk? I'm an extractor, not a xenologist. I don't work for the Dominion. Why are you interested?"

"Q was telling me some of the other majors let them into their compounds."

Daniel shook his head disbelievingly. "That's one hell of a pet you'd have there."

"No, they're not pets—they do different jobs."

"Huh," he grunted. "I didn't think they were bright enough. Rheinchem'd better not be thinking about trying to turn them into extractors."

"It's nothing like that. They're—kind of domestics."

"Oh," he said, losing interest. Then he grinned maliciously. "But if the company wanted to start replacing the techs, I could get behind that."

Carii answered the joke with an encouraging smile. But the moment of warmth did not lead to a thaw.

"I think I'm going to go to bed myself," he said, rising.

"All right if I come, too?" she asked hopefully, looking up at him.

He frowned. "I'd rather you gave me a head start. I have trouble falling asleep with you there."

"Sure," she said, smiling. "I'll read a little while."

But behind the smile Carii was dying. *You used to appreciate my distractions. What's happened to us? Why don't we touch anymore?*

But she knew the answer. Their lives, once nearly congruent, now overlapped only at the edges. How could she be interesting to him when she did nothing interesting—in his eyes, did nothing at all? How could he take her seriously when he was the one with all the responsibility?

She waited until she heard the slow, raspy breathing which meant that he was asleep, and then went to the omnicom.

"Q?" she said, fighting back tears. "I've thought about it some more. Could you please call Joanne for me?—"

Carii had never had any reason to talk to Hamilton Rees before. Few extractors ever did. The Dominion's resident representative— r-rep in the local argot—usually dealt with the corporate types. And between his roles as land agent, customs inspector, contract arbitrator, and the like, he was on the move so often that his permanent residence was a custom VTOL shuttle that was little more than a flying bedroom.

But now she had a reason. Her call the next morning caught up with him halfway around the planet, at Kaladar Systems's equatorial camp. It was night there and Rees looked tired, an impression which was confirmed when he spoke.

"You just caught me—I was about to shut the omnicom down and turn in," he said. "What can I do for you, Mrs. Donovan?"

It was no compliment that he knew her name, since the omnicom would have told him when her face first flashed on his screen. "Carii," she said.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"All right—Carii. What can I do for you?"

She hesitated. "I guess you probably know more about the Baesk than anyone on Farley's World."

"I guess that's right," Rees agreed easily, "as long as you realize that it doesn't make me an expert."

"But you speak their language—"

"Passably."

"—and you've gone out into the forests to study them."

"A half-dozen field contacts, none more than two days long. It's hard to get away from my duties long enough to do it right. What's your interest, Mrs. Donovan—Carii?"

"Well—I've heard that Baesk were coming into some of the compounds—"

"Yes?"

"Is that legal? I thought we were supposed to leave them alone."

"We're supposed to leave their habitat alone and leave them alone in it. But there's no quarantine. As far as the compounds go, our doors are open. It is their world, after all."

"Has anyone—you're going to think I'm being silly—used them as babysitters?"

Sudden understanding lit Rees's expression. "As far as I know, no one is using them for anything else."

"Is—is it safe?"

Rees sighed. "Look, Mrs. Donovan, I'm going to tell you the same thing I told Joanne Arfons and Ken Richards and the six other parents who called me to ask more or less the same questions in more or less the same order. There've been humans on this planet for forty years. From the time of Farley's first visit, there is not one recorded incident of a Baesk attacking or injuring one of us. There isn't even any suggestion that they fight with each other—the claws they sport notwithstanding."

"Then it *is* safe."

"I'm not finished," he said curtly. "I've always thought it was a good idea to know something about the people you trust your children to. You don't know enough. I'm not sure that I do."

She could not keep her disappointment from her face. "What are you saying, then? That I can't have a Baesk as a nanny?"

"I wish I could say that, Mrs. Donovan," Rees said tiredly. "Unfortunately, when I said it the first time—oh, almost six months ago—the site supervisor for Resources Unlimited decided he didn't like that answer. He and his wife went over my head to the regional director and got a ruling that such an arrangement was not exploitation of the Baesk, which is when and where all this started. So all I can do is strongly counsel you against it."

"It's up to me, in other words."

"I'm afraid so," Rees agreed. "Is that what you hoped to hear?"

"Well—as a matter of fact, it was."

"Then good night, Mrs. Donovan," Rees said with barely disguised contempt. "Happy to have been of service."

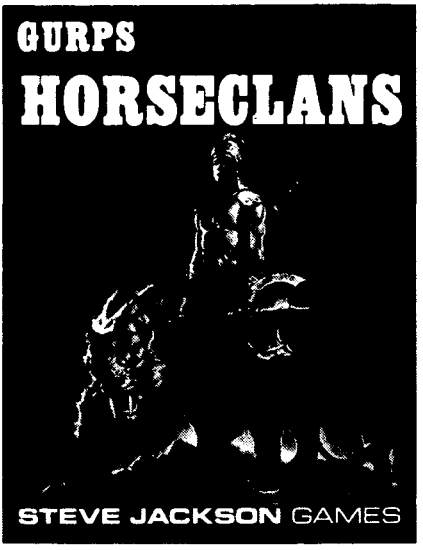
Frontier Metals's installation was the nearest of any of Rheinchem's competitors, but at that was an hour away by shuttle, hard by the Sigma Range. From the air, the camp looked more like a small city than a worker compound. The housing mods, of which there were easily a hundred, were Webly luxury

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

They ride the plains of a post-holocaust America, telepathic prairiecats by their sides. They're deadly warriors — for honor, for loot, or just for the joy of a good fight. They would follow their leader, the undying Milo Morai, straight to Hell. And they'd come back with trophies.

They're the

Horseclans



Now, Robert Adams' best-selling *Horseclans* series comes alive in the newest supplement to the *Generic Universal RolePlaying System*. This 96-page book is a complete concordance of all published *Horseclans* material, with maps, historical and geographical information, lists of names, and everything else you need for a complete *Horseclans* roleplaying campaign.

Also included are rules for Undying characters, "mindspeak" and other psi abilities, and a quick system for resolving *large* battles and determining their effects on player characters.

Ask your retailer for this and other great *GURPS* books. ***GURPS Horseclans*** is $9.95. It is a supplement to the ***GURPS Basic Set*** — you need both in order to play. The ***GURPS Basic Set*** is $24.95.

If your local store doesn't have our products, send $10.50 for ***GURPS Horseclans*** and $27.50 for the ***GURPS Basic Set*** to order by mail (postpaid). Texas residents please add sales tax (74¢ for ***GURPS Horseclans***, $1.95 for ***GURPS Basic Set***). Send a SASE for our free catalog.

STEVE JACKSON GAMES
Box 18957-J Austin, TX 78760

GURPS is a registered trademark of Steve Jackson Games Incorporated.
Horseclans is a trademark of Robert Adams. All rights reserved.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

models, and the managers had even gone to the trouble of laying in a natural-grass park-playground at the center of the compound.

Carii regarded the park and the Webly homes with an air of superior condescension. *It gives them a recruiting edge with the new licensees, sure*, she thought as she walked toward the address she had been given. *But all those frills cost, and the kids don't realize until they're here that they're the ones who're paying.*

For the most part, the competition between the firms was low-key and friendly, since both were having no trouble selling their full output in the expanding market for exotic metals. Rogue miners always worked the seller's markets, switching their recovery strategies and base of operations when the price premiums began to get squeezed. There was very little of Rheinchem's investment on Farley's World that could not be picked up and carried to another world. A single K-class freighter could do the job.

But when it came to human resources, it sometimes got nasty. Frontier would take any Rheinchem extractor they could get, but they succeeded in coaxing few away. Frontier extractors would take any Rheinchem job they could get, but there were few openings. Quiana was one of those who had succeeded in making the move. That was how she knew Joanne; that was the chain which had brought Carii to a stranger's door in a rival camp.

"Hi," Carii said with a nervous smile as the door opened.

Round-faced and five years younger than Carii, Joanne Arfons smiled back. "Carii—you found it. Oh, what a little love you've got there," she said, peering at Darla, who was asleep on Carii's shoulder. "Come on in. They're out back."

"I can't thank you enough for helping me out—" Carii began, stepping past the other woman and into the mod.

"Oh, I don't mind a bit," Joanne said, closing the door. "Who knows better than someone else who's been there?"

By that time, Carii already knew that she was going to like Joanne. "Not my husband, that's for sure."

"Amen to that. Do you want to go out and meet her, or do you just want to watch for awhile?"

"If I could watch first—"

"Sure. There's a window that looks out on the courtyard."

"Is there some place I can put Darla down? I don't want her to wake up to any surprises."

"How about in the middle of my bed?"

Carii followed her toward the back of the mod. "That's fine. What's your little girl's name again?"

"Krystal—"

They stood together at the glass and looked out. Child and alien were crouching side-by-side over the scattered pieces of a toy, but Carii barely glanced at the girl. Golden fur, hooded eyes, long-fingered beclawed hands—they were what riveted her attention.

Based on the pictures she'd seen, Carii had cataloged the Baesk as a sort of leonine gorilla. But seeing one sitting there playing with the child, the way it held itself, the way it moved, all im-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

pressed on her that it was a creature unto itself, with no debt to any terrestrial species or obligation to her naive expectations. It was Baesk—stocky, broad-shouldered, graceful, alert—and dangerous.

"How could you do it?" Carii whispered. "The first time, I mean. How could you go away and leave Krystal with something that looks that that?"

"I'd already spent a lot of time watching them together—I didn't want Krystal to be scared. So I already had seen how gentle Shas is. It was a bit of a test, though, the first time." She smiled sheepishly. "I called Krys about every half hour that first morning, until she got impatient with me and said, 'Mom, stop being such a worrier.' "

"So she took to it—to Shas—right away."

"The truth is that Krys'd rather play with Shas than with us," Joanne said. "Sometimes at night it's all I can do to get a hello."

Krystal was laughing now, and the alien responded by hammering the tips of its claws together in a flurry. The sound reminded Carii of that made by a woodpecker.

"That's how they talk, you know," Joanne said. "No vocal cords—they look like they ought to growl, don't they? Or purr."

"How long did it take you to learn its language?"

"I haven't."

"Then how do you—"

"Shas seemed to know just what to do. Maybe the other Baesk coached her—all the nannys come from the same enclave. But I think most of it's natural. It's like they're made for this. They treat the children like they're the most important things in the world. And patience—Shas never seems to get bored. She'll sit there and play the same silly game as long as Krystal wants to."

"You make it sound like a perfect dream."

"It has been, for us. There's only four other children in the camp, none within three years of Krys's age. Krys came to me just last week and said that Shas was her best friend."

"Isn't there *some* down side?"

Joanne shrugged. "Shas can't read to her, of course, which is something I'd like, but Krys can read well enough by herself now. And Shas makes sure that Krys logs into her teacher three hours a day—sits there right next to her. That's been a big help."

Just then Krystal reached out and threw a big hug around her alien companion's neck. It was sweet, natural, and spontaneous. There was a obvious bond between them. The girl might have been hugging an old collie or a new pony for all the difference it made.

Or her mother—"If I'm not prying—how much do you pay her?" Carii asked tentatively.

Joanne looked at Carii in surprise. "Didn't Q tell you about that? That's the best part. Nothing. They do it for love, I guess," she said. "So—what do you think? Are you still interested? Shall we go ask Shas if there's another one home like her?"

Carii worried her lower lip between her teeth as she weighed her decision. Guilt hammered at her, as did fear. A three month old was a far different proposition than a seven year old. But what swayed her in the end was seeing that

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

a mother like Joanne—a good, responsible parent—found it a worthy thing to do, not just for herself and her husband, but for Krystal as well. And there were no irreversible decisions. The only commitment she was making was to explore it further.

"Let me get Darla first," she said. "We'll *both* meet her."

It was easy enough for Joanne to ask Shas—half in pantomime and half in Standard—if there was one of her kin who would be interested in looking after Darla. And there was no confusion about the answer: yes—a double click of the thumbclaw and midclaw of the right hand.

But sorting out the where and when and how proved to be too difficult a test of Joanne's cross-species communications skills. Carii left Joanne her name and address in exchange for a promise that Joanne would contact the family through whom her own sitter had been arranged.

For two days, Carii heard nothing. On the third day, she received a mail message from Joanne that her Baesk, answering to the name Leth, would arrive at the Rheinchem camp around dawn the next day.

The news brought on a minor crisis. Following the principle that it was easier to get forgiveness than permission, Carii had not yet spoken to Daniel about her plans, and did not intend to until she herself was certain it was what she wanted to do. Carii had decided she would take as many days as she needed to coach the alien in the special skills needed to care for an infant and to watch how it behaved. If it passed that extended audition, then, and only then, would she tell Daniel.

But that plan meant that the Baesk would have to arrive after the morning change-of-shift and leave before the evening one. Dawn was much too early.

Carii called Joanne, but the younger woman could offer no help. "First of all, from what I was told Leth is already on her way there. Second of all, you can't say to a Baesk, 'Be here at eight-thirty.' Sun-time is all they know. And even if you could, they'd show up an hour early, because that's the way they are. Why don't you just tell your husband now?"

But Carii knew that if she presented it as a *fait accompli*, she had a much better chance of avoiding an argument. In a panic, Carii called Central Services.

"I need to know about the gate."

"What do you need to know?"

"The rules—"

Her ignorance was not remarkable, for the gate was rarely used. Except for the odd amateur xenologist or those who preferred hiking over the exercisers in Tower 2, virtually everyone entering or leaving the compound did so by air. So the answer to her question was delivered in a slightly bored voice, as though it were a familiar question.

"Anyone leaving the compound on foot has to register with the Manager's Office and sign a statement about ecological interference. The gate isn't locked—your identity card will open it."

"What if someone was coming from outside?"

"Your identity card works both ways—"

"I mean a visitor."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"From outside? I guess somebody'd have to let them in, then."

"There's nobody at the gate? Nobody checks it?"

"No—say, you've got me curious. Who'd be coming from outside? It's a hundred klicks to the nearest camp. Unless you mean a Baesk—"

Before Carii could deny it, something in her expression must have betrayed her. "Hey, I'd like to see that," the aide burbled on. "What's this all about? When's it coming?"

"It's not set yet," Carii lied. "Maybe a week or so. Listen, this is still a secret. I'll tell you what—if you promise to keep quiet about this, I'll make sure you get to see the Baesk when it comes here."

The deal was struck, but it gave Carii no comfort. Her family's mod was on the outer periphery of the compound, less than a minute's walk from the gate. She had hoped to take advantage of the solitude that she had been complaining about and smuggle Leth in and out without fuss.

But that was a vain hope, she now realized. If even so much as one person saw her with the Baesk, there *would* be a fuss, and inevitably someone would say something to Daniel. It was not a secret that would keep.

Give me one day, at least, she prayed. *Give me that much of a chance to know if I'm doing the right thing.*

It was difficult for Carii to mask her impatience the next morning as she watched from the bed as Daniel showered and dressed. The pale orange sun of Farley's World would have been up for two hours by the time he left for the shuttle pad, and she wanted to be ready to fly out the door the moment he was aboard.

But to vary her routine would be to risk raising his curiosity, and so she stayed under the sheet and feigned the sort of dull-witted lassitude he had come to expect from her in the morning. Darla was a late riser, and since she had stopped working—or more precisely, since she had stopped caring—Carii had become one as well. With a weak smile and half-lidded eyes, she kissed him goodbye from the bed.

Then, the moment the front door sealed, she bounced up and headed for the Personal. In less than ten minutes, she had speed-showered, pinned her hair up and dressed in an inconspicuous blue-grey caftan. She looked in on Darla and found her soundly asleep, face-down with her legs tucked up under her and bottom high in the air.

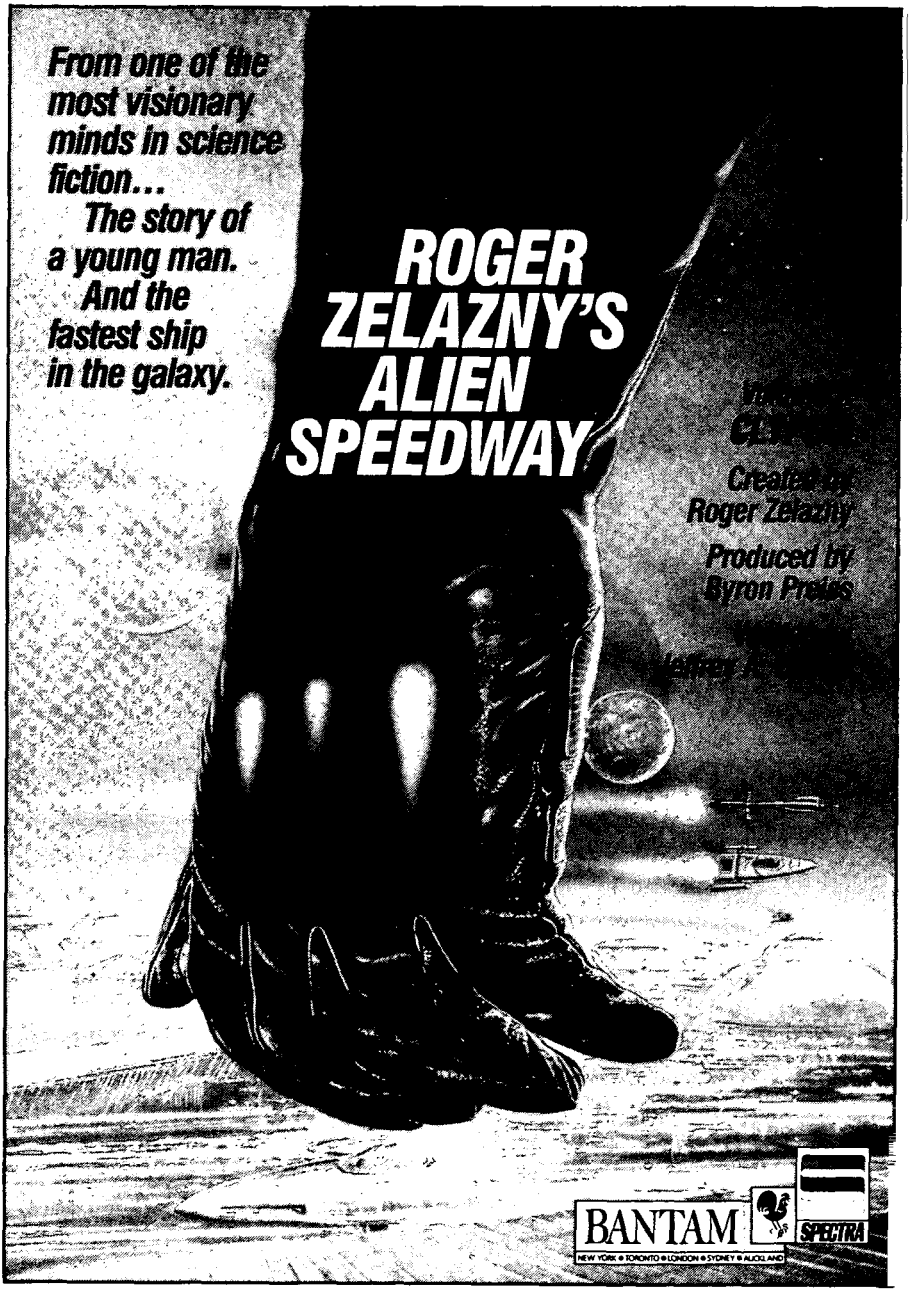
"Back in a moment, love," Carii whispered.

There was a perimeter road just inside the compound wall, a concession to potential xenophobes who might be uncomfortable living elbow-to-elbow with the untamed ecology of an alien world. In the hour or two before a change-of-shift, the road was home to an assortment of joggers getting in their licks before starting work.

But the rest of the day, the perimeter road was deserted. Feeling like the mysterious woman in some obscure spy novel, Carii hurried along the road toward the gate. She saw no one, and as far as she knew no one saw her.

The gate was nothing more than a door inset into the perimeter wall, wide enough and tall enough to allow a stand-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED


From one of the most visionary minds in science fiction...
The story of a young man. And the fastest ship in the galaxy.
ROGER ZELAZNY'S ALIEN SPEEDWAY
Creator of Roger Zelazny
Produced by Byron Preiss
BANTAM
SPECTRA
NEW YORK • TORONTO • LONDON • SYDNEY • AUCKLAND

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ard-width ground vehicle to pass through. A window spanning the width of the door at eye level gave Carii a view of the cleared area surrounding the compound—the fire zone, it was called—and the forest beyond. There was no sign of Leth.

Damn, Carii thought. *She didn't wait. Or didn't get here. Oh, this is crazy—*

The gate controls were at the right, under a bubble-like weather hood. Reaching under the hood, Carii inserted her identity card into the slot. With a creak of protest, the door began to move to the left. Bright morning light and a gentle breeze poured through the opening.

Carii left her card in place to keep the door open and stepped through the doorway. Immediately her peripheral vision told her of a shape to her right, along the outside of the wall. Her breath caught in her throat, Carii turned slowly that way, and there she was, crouching a few steps away on the matted tanglegrass.

Brown eyes framed by pale skin sought the gaze of blue eyes framed by auburn fur. Was it projecting too much to read recognition, curiosity, apprehension there? Even so, Carii could not look away or speak.

She did not know how long she stood there, frozen, her breath caught in her throat. It was the gate, chiming a polite reminder that the door was still standing open, that finally distracted her. She looked toward the opening, then back to the Baesk.

"Leth?"

Rising from her haunches, Leth double-clicked a "yes." If anything, she was larger than Shas, taller and broader in the chest.

"I'm Carii," she said, swallowing hard and tapping her chest. "It's my daughter you're here about."

She had no idea how much of what she said Leth understood. But when she gestured in the direction of the gate, took one step toward it, then looked back to see if Leth was following, she was.

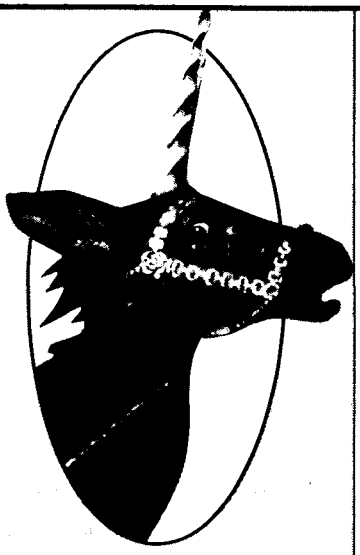
They entered the bedroom together to find Darla awake. The baby was lying on her back, hands raised above her head and closed into tiny fists, legs kicking randomly, eyes darting from one focus to another, mouth working. At the sight of Carii, Darla's round face lit up in a smile and she gurgled at the back of her throat.

But cries of hunger were not long away. With Leth looking on curiously, Carii exchanged the wet diaper for a dry one. Then she gathered Darla up in her arms and settled in the sunlit corner chair below the small window.

It was where she always sat when she fed Darla in the morning, part of what had become an unconscious ritual. Even with Leth there, she fell into it unthinkingly, not realizing until Darla was nursing that she might be making a mistake. This was one thing that Leth could never do for Darla, one kind of moment that the two of them could never share. To parade it before her first thing—

Yet there was something prideful in that thought, something that brought on a flash of smug superiority. Suddenly she was glad to be nursing Darla in front of Leth. It as as though she were saying, *I may leave her with you for a few hours*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



A Magic Kingdom of Landover Novel

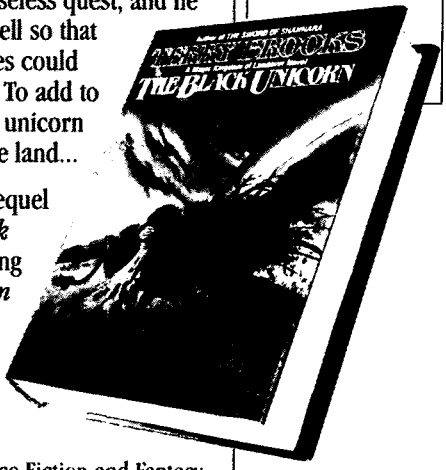
by TERRY BROOKS

THE BLACK UNICORN

A Del Rey Hardcover On Sale in October $16.95

Ben Holiday was rightful King of the Magic Kingdom of Landover. But now the evil Wizard Meeks had displaced him, his beloved Willow was lost on a useless quest, and he was under a spell so that only his enemies could recognize him. To add to it all, the black unicorn was loose in the land...

A superlative sequel to the *New York Times* bestselling *Magic Kingdom for Sale—Sold!*



DEL REY #1 in Science Fiction and Fantasy
Published by Ballantine Books

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

each day, but you can never be to her what I am to her.

At the same time, there was something guilt-making in the realization that no matter how gentle and attentive Leth might prove to be, she could never be other than an imperfect substitute. A sudden wave of shame and self-accusation nearly prompted Carii to send Leth away. This is crazy, she thought. How can I do this?

It was Leth's expressive blue eyes that stopped her. Carii looked up from Darla and caught full force the tenderness and longing pouring forth from the alien as she crouched near the foot of the bed. It was as though Darla had already capitvated her, already won her heart.

And Carii knew, from that moment and that look alone, that Leth would never knowingly harm her child. Whether Leth could be taught enough to affirmatively protect Darla from harm, Carii did not yet know. But for the first time since Q had put the thought in her head, Carii was not afraid to try.

As the day developed, Carii could not have planned a better introduction to the nuances of caring for a three-month-old. All the misadventures were there, from a minor crying fit to a leaky toxic-waste diaper to a round of refuse-the-nipple.

But so were the pleasures: the happy "ah-ah-ah" sounds that Carii took for laughter, the continuing discovery with hands and eyes of the world outside herself, the games of sit-me-up with one of Carii's little fingers clutched tightly in each of Darla's little fists.

And the pleasures and misadventures both were woven into the pattern of an ordinary day. The late rising. The short morning nap. The active, playful time after the midday feeding. The long afternoon nap.

If it had gone badly, Carii would have hustled Leth out of the house before Daniel's return and written off the whole idea. But it had not gone badly, though it was several hours before she trusted Leth enough even to let her touch Darla. The claws troubled Carii. It was hard not to associate them with those of more feral predators.

But by the time she heard the sound of the shuttle engines announcing change-of-shift, she had gotten past her fear. She had looked on while Leth retrieved Darla from her bed at the end of the afternoon, and seen that both the baby and the alien were comfortable with each other.

So as the engine noise rose to a peak and then idled back, Carii carried Darla into the bedroom and handed her to the Baesk. Indicating with gestures that the two should remain there, she then went to wait for her husband at the front door.

He was barely inside when Carii attacked him with an enthusiastic kiss. Then, seizing his hands in hers, she regarded him with a sober expression.

"Daniel—if I figured out a way that I could start work again, would you give me a chance to try it, even if you weren't sure it would work?"

"What are you talking about?"

"Answer the question. Do you trust my judgment?"

He hunched his shoulders noncommittally. "I told you when Darla was born that all the decisions were yours. Why?"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Come on. I have something to show you."

Touching a finger to her lips, she led him to the bedroom and pushed the door open. Leth was in Carii's morning corner, squatting on the chair in the same way that she crouched on the ground. But that was not what brought the smile to Carii's lips. For, eyes closed and bottom high, Darla was nestled face-down on Leth's huge soft hands, encircled by a halo of claws.

Carii had a death grip on Daniel's hand in case he might make some sudden move and startle Leth, Darla, or both. But as she had expected, he was too startled himself for that. Slowly he turned to Carii, his eyes pleading with her for an explanation. "What—?" he managed to say.

"Her name is Leth," Carii said, looking past him to the alien and smiling. "She's going to be Darla's nanny."

It was not quite that easy. Daniel found objections as quickly as he found his voice. But she had ready an argument that she knew would still them.

"Daniel, with Leth to look after Darla, ten months from now we'll be back on Stoneport with just a little smaller house stake than we'd planned on having. But otherwise, you're going to have to sign another contract here. I'll leave it up to you. If you don't mind the extra year, I don't mind staying home with the baby."

She saw surrender in his eyes before she was even half finished.

"All right," he said. "Let's give it a try."

It was another week before Carii felt sure enough to leave Leth and the baby alone even as long as it took to walk one circuit of the compound. Over the span of a second week, she gradually worked up from an hour away from the mod to a whole morning.

By that time, Daniel's caution had completed its metamorphosis to impatience. "Are you going to do it or aren't you?" he demanded of her one night. "What's the hold-up?"

"I want to be sure. I'm being careful."

"Fine," he spat. "But keep in mind that every day you wait, you cost the family eight hundred dollars."

It was an ugly little reprise of the exchanges they had had in the month before and after Darla's birth, before their arguments had devolved into silence. But this time, there was something she could do to sweep the bad feelings away. The very next morning, she boarded the outbound shuttle one step ahead of her husband.

"Leth?" Carii called as the front door slid back. "We're home."

With Daniel trailing a step behind, Carii emerged from the entryway into the family room. Six of the last nine days, she had come home to find the alien and the baby in the carpeted pit, playing. Darla making faces—rubbing her face in Leth's fur—grasping Leth's claws as though they were fingers and tugging mightily. But the pit was empty.

"Darla, honey, Mommy's here."

Carii expected that pronouncement to elicit a staccato reply from Leth, a happy burble from Darla, or both. But she was answered with silence.

"Still napping?" Daniel asked at her shoulder.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Must be. Leth always sits right there with her," she said, heading for the bedroom. She pushed the door open, an anticipatory smile creeping onto her face. But the smile vanished when she peeked into the room.

"Daniel, they're not here."

"What?"

"Look in the kitchen," she said anxiously, a chill on her heart.

It took a bare few seconds for Daniel to comply, but it seemed an eternity. "No," he called. "Not here either. Leth must have taken her out."

"She didn't have permission to do that," Carii said, laboring to keep her apprehensions in check.

"How would she have known? You can't talk to her in anything but sign language," he snapped, moving toward the omnicom.

"Who are you calling?"

He ignored her question and addressed himself instead to the screen. "Brian? Our nanny seems to have gone wandering in the compound with the baby. Could you lend a hand tracking them down? Thanks."

Keying off, Daniel looked up at Carii. There was something accusatory in his gaze, but she swallowed hard and did not look away.

"Coming?" he asked.

"You didn't need to do that," she said. "We could find them just fine by ourselves. Leth just took her for a walk."

The door chime sounded, and Carii started. "There. That's them."

But it was Brian and his wife Ksandra, who lived in the unit upstairs. "Ksandra thought you might like to have someone stay here while you looked, in case they came back," he explained.

The look of earnest compassion on Ksandra's face was almost too much for Carii to take. "Thank you," she blurted, and brushed past them, eyes lowered, to begin the search.

Rheinchem's housing compound had never seemed so large to Carii as it did as she walked its streets, calling Leth's name and hearing Brian and Daniel doing the same one block on either side. Their calls brought other residents to their windows and a few to their doors; before they were done, a half-dozen had joined them.

But no one they encountered had seen a Baesk and a baby afoot in the compound, and none of the searchers caught as much as a hopeful glimpse of their quarry.

Puzzled and frustrated, they stood in a group on the perimeter road near the Donovan's mod and searched for other answers.

"Did anybody check with the CS health office?" one volunteer asked. "Maybe the little girl took sick."

"I did," Daniel said. "They didn't receive any calls—from Leth or anyone else."

Carii's patience was stressed to the breaking point. "Where could they be? Where could they have gone?"

"Outside?" someone suggested tentatively.

"How could Leth open the gate?" Carii demanded. "She didn't have a card."

"Maybe they're in someone's house," Brian suggested. "If they did go out walking—with Leth being such a curi-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ART BY FRANK FRAZETTA

L. RON HUBBARD *presents* WRITERS *of The* FUTURE

VOLUME III

Soar into the unique and different worlds of SF's freshest, newest creators! Discovered by the acclaimed international Writers of The Future talent search, these are the startling, provocative vanguard of the award-winning next wave of science fiction and fantasy new ideas!

"...One of the best collections of new science fiction I've ever seen!" said **Arthur C. Clarke** on Writers of The Future.

Scores of other major SF figures and commentators have echoed his opinion. Now delve into the latest and best of this widely-praised series!

Monsters and starships, time-travellers and aliens, robots and rebels...all abound in these pages. Plus practical how-to advice on writing by Gregory Benford, Frederik Pohl, Jerry Pournelle...and a major statement on art and communication by best-selling master L. Ron Hubbard himself!

"The best of the fresh talent..."

—GENE WOLFE

"The best, the very best..."

—MIDWEST BOOK REVIEW

14 all-new stories! Essays and contest information! And a stunning new Frank Frazetta wrap-around cover painting! Buy your copy today! $4.50 wherever fine books are sold!

Copyright © 1987 Bridge Publications, Inc. All rights reserved.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

osity around here—would she know how to refuse an invitation? She may be confused about what's expected. And you said she doesn't have any sense of time. Maybe we could get Central Services to pipe a notice into everyone's mod—''

That was when Carii, her attention wandering, noticed the thumb-sized gouges in the face of the perimeter wall. Detaching herself wordlessly from the group, she walked slowly toward the wall, staring. The gouges started at knee-level and continued in an irregular pattern straight up to the top.

''It didn't go out the gate,'' she said hoarsely. ''It went over the wall.''

Her words were too softly spoken to be heard by the others, but by then Daniel had noticed her standing alone by the wall. ''What are you looking at?''

Just then Ksandra appeared beside the mod. ''Carii—there's a call for you,'' she cried. ''She said its important.''

Without a word, Carii ran toward the mod. The caller was Joanne. Her hair was in disarray, and she looked like she'd been crying. ''I'm calling to warn you. Something's happened with the Baesk,'' she said. ''Watch Leth—''

''She's gone,'' Carii cried. ''She took Darla.''

Joanne closed her eyes in pain. ''Then I'm too late,'' she said wearily. ''They're all gone.''

''What?''

''The Baesk. They've taken all the children.''

This time, the shuttle to Frontier Metals was full. Some had come to lend moral support, others to join the search party being formed by the parents and their friends. There was little talk and much looking out of windows, for the shuttle pilot had been informed and was flying lower and slower than usual.

Carii had a window seat, but little hope to inspire her. The great forests of Farley's World were too remote. To look out at the ground flashing by below was to wallow in helplessness, and yet she could not do otherwise.

On top of that, all during the flight, Daniel rode her cruelly. ''Whatever happens to Darla, you did to her,'' he would whisper nastily in her ear. ''This is your fault for being so selfish. I trusted you and you were wrong—''

The spots he was working with his verbal needles were already raw and sore, and it did not take much to start her crying. When that happened, he would sit back in his seat and look the other way, as though it were none of his doing, until she regained control. Then he would start on her again, as though making her cry conferred on him some sort of moral superiority.

She knew what he was doing to her, and yet could not muster enough of an impulse for self-preservation to make him stop. It was easier to let herself think despairingly, *he's right—this is my fault—oh, Darla, what have I done to you—*

It was not until they reached the Frontier Metals compound and saw the haggard faces of the other parents gathered there that Carii understood the true dimensions of the horror facing Farley's World.

According to the Dominion's census, there were sixteen minor non-contract personnel—that is, children—on the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

planet. Seven of them, all under ten years old, had Baesk sitters, playmates, or nannies. Every one of the seven was missing.

That included Darla, five from Frontier (among them Joanne's Krystal) and the manager's son, Eric, from Resources Unlimited. In a surprising bit of synchronicity, they had all disappeared with their Baesk companions within four hours of each other. None had left either a trail or any clue to an explanation.

But there was no uncertainty about what had to be done. That much had been settled hours ago. "We're going out to get them back," Joanne's husband Lonas had told her. "You can come if you want—we'll be a little while getting things together."

They were nearly ready, the two crawlers loaded down with foodstores, wilderness gear, and a dozen hard-eyed parents, when the red-and-white Dominion shuttle roared up from the west and settled on the grass of the park. Almost the moment the engines were cut, Hamilton Rees scrambled out of the hatch and came walking toward them.

Nudging each other and passing the word in whispers, they were all watching as he drew near. "What's this all about?" Rees said casually, as though he had stumbled on a spring outing he had been excluded from.

"What the hell do you think?" a man cradling a laser rifle snapped back. "We're going after our kids."

"This is your fault, Rees," a woman accused. "You're supposed to keep those monsters under control."

Carii knew the terrible unfairness of that, but Rees did not seem to react beyond raising an eyebrow in her direction. He glanced quickly from one face to the next, measuring the anger and fear he saw there. "Do any of you speak Baesk?"

There was some uncomfortable shifting, but no one answered in the affirmative.

"About what I thought. Then how are you going to talk to them?"

A woman perched on the front deck of the nearest crawler spat. "I'm going to shoot the first of those furry bastards I see. Then maybe I'll feel like talking."

"I'll bet that thought feels good," Rees said. "But what if you open up on the Baesk and kill your own child, or the Donovans', or the Millers'? That won't do."

"So what do we do?" someone else called from the top of the crawler. "Wait until they've killed them?"

Rees tried to find the eyes of the questioner. "They have to know that if they hurt our children we'd never leave them in peace. This has to be something else. Maybe they finally decided they do care if we tear up their mountains."

Daniel folded his arms over his chest and growled, "I don't think much of their negotiating style."

"The point is that we don't know what they want, and the only way to find out is to talk to them. We can't go after them without endangering the kids."

"You telling us to just sit tight?"

"I guess I'm asking you, anyway," Rees said, resting his hands on his hips. "Fact is, you'll do what you think's best for the kids, and worry about how many Dominion laws you're breaking later. I just hope you'll see that the best thing

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

for the kids is to put away that hardware and go home."

"Maybe we should pray, too," one of the miners jeered.

"Maybe," Rees agreed easily. "It can't hurt—which I can't say for taking an armed mob into the forest. Christ, don't you know where you are? That's not Earth out there, or even Stoneport or New Home. That's the Baesk's bailiwick, and they've got half a million years experience with it. How much do you have? They're not the bloody aliens—we are. Do you really think a few weapons will erase the difference?".

The group had chosen no leader, but Lonas had begun asserting himself as one as they had been loading. Now he stood up atop the first crawler's cab and addressed Rees as from a dais.

"Fact is, Rees, we've got one problem and you've got another. Ours is finding our kids and getting them away from the Baesk," he said. "Yours is that we don't give a damn what we have to do to the Baesk in the process." He turned to the others. "Mount up, everybody. Let's get going."

The engine of the first crawler roared to life, and one of the men in the watching crowd ran to open the gate. "You can't win your way," Rees shouted over the noise.

"You mean *you* can't," Lonas called back as the vehicle lurched forward.

Carii had watched the drama from her seat on the second crawler with an uneasy foreboding. Since she had joined the group, she had become as uncomfortable with the lovingly brandished weapons as she had once been about Leth's claws.

"If you think you can show us a better way, then maybe you'd better come along," she called suddenly to Rees.

He did not seem to hear her. His frown betraying his irritation, Rees let the first crawler roll by. As the second crawler started up, he looked skyward, and shook his head in dusgust. Then, almost at the last moment, he reached out, caught a handhold on the passing vehicle, and pulled himself aboard.

Since she was closest, Carii offered him a hand to help him up to the cargo bed. He ended up seated beside her, folded hands hooked over knees drawn up toward his chest. Their shoulders brushed as the crawler bumped and swayed its way out of the compound, but otherwise he seemed to take no notice of her.

"If you want to say you warned me, you've got the right," she said quietly.

He turned his head toward her and smiled a small reluctant smile. "What do you want to do that to yourself for, Carii?" he asked gently. "You don't need extra reasons to hurt right now, do you?"

After the way Daniel had been on the plane, compassion was enough of a surprise to rob her of her protective self-hate. Feeling naked, she met his eyes for a long moment.

"No," she said at last, struggling with an answering smile. "Thank you. You're right. I don't need any more of that at all."

There were three known Baesk enclaves in the forests surrounding the Frontier Metals camp. The closest one, about twelve hours away by crawler, was a "grandhome" in Farley's no-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

SYLVIA PORTER'S PERSONAL FINANCIAL PLANNER DOES MORE THAN MANAGE YOUR MONEY

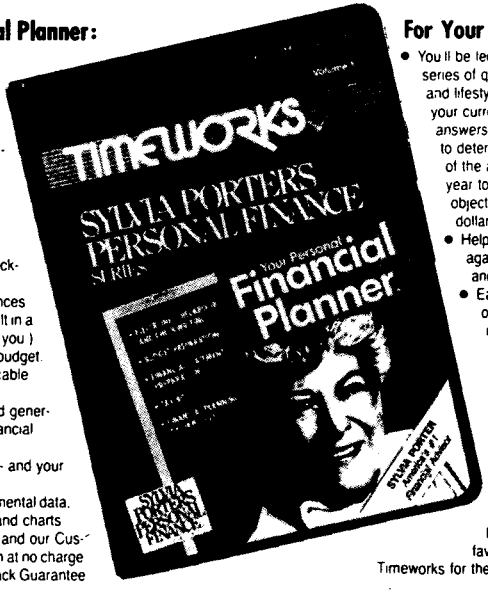
IT PLANS YOUR FINANCIAL FUTURE TOO

Sylvia Porter, and the editors of Sylvia Porter's Personal Finance Magazine, now combine with all the computer tools you'll ever need to help manage your money on a day-to-day basis and plan your financial future, too. In Sylvia Porter's style, without complicated financial jargon or "computerese".

Volume I

Your Personal Financial Planner:

Helps you track your day-to-day financial data, then combines this information with your future financial objectives to *produce the most comprehensive* and easily-understood financial planning program available.



For Your Day-to-Day Affairs:

- Maintains your electronic checkbook and credit card system.
- Writes your checks and balances your checkbook. (We even built in a calculator and memo pad for you.)
- Prepares and monitors your budget.
- Classifies and tracks your taxable income and expenses
- Calculates your net worth and generates customized personal financial statements
- Tracks your financial assets – and your insurance policies
- Graphically generates supplemental data, such as percentages, ratios and charts
- You get our Toll-Free Hotline and our Customer Technical Support Team at no charge
- You get Timeworks' Money Back Guarantee (Details in each package.)

For Your Financial Future:

- You'll be led step-by-step through a series of questions regarding your life and lifestyle, your financial goals, and your current financial condition. Your answers will enable a computer to determine and print a summary of the amounts you must save each year to meet your financial objectives - in both real and inflated dollars
- Helps you plan for protection against major medical adversities and other financial setbacks.
- Each program interfaces with others in this series. Your information can be incorporated into letters and reports produced by Timeworks' Word Writer.
- Everything is integrated. You need to enter data only once

Available for Apple, IBM and Commodore computers.

Moderately Priced - from your favorite Dealer or contact Timeworks for the Dealer closest to you.

Next in this integrated series:
Your Personal Investment Manager.

Other Timeworks Programs: The Evelyn Wood Dynamic Reader • Word Writer with Spell Checker • Data Manager 2 • SwiftCalc with Sideways • Business Systems • Swiftax • Cave of the Word Wizard • Wall Street

TIMEWORKS®

More power for your dollar.

TIMEWORKS, INC., 444 Lake Cook Rd., Deerfield, IL 60015, 312-948-9200

From America's #1 Financial Adviser

© 1984 Sylvia Porter's Personal Finance Magazine Co. & Timeworks, Inc. All rights reserved

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

menclature, inhabited primarily by older unpaired Baesk.

None of the nannies had come from there, but even so there was some chatter about the parents taking hostages of their own. Carii was relieved when Lonas quashed that idea, agreeing with Rees that the risks and complications outweighed any possible gains.

So they altered their course in the middle of the night, heading instead for the largest of the enclaves, nine hours further away. By consensus, they drove on steadily with no stops, making do with cold meals and the cramped single toilet at the back of the crawler's cab. A hammock slung between the siderails across the back of the cargo deck gave a few a chance to nap without being jolted by the crawler's passage over the uneven ground.

Within the forest, morning meant a gradual brightening from black to a diffused light which neither cast shadows nor erased them. But it was enough to bring people back to the siderails to peer out between the widely-spaced trees and up into the solid canopy made by their umbrella-like crowns.

Rees was an exception. One of those who had made use of the hammock, he spent part of the morning consulting his files by means of the crawler's omnicom. Then he moved out to the tailboard and settled there to practice Baeskan.

No human could speak the aliens' language, but there was a simple tool that bridged the gap. Farley's original version had been a flat board with four hammer-like "clickers" suspended above it. Rees's version was a refinement of that design. The board had been replaced by a tuned wooden tube, so that each clicker had a slightly different timbre, just like a Baesk's claws. Rees wore it strapped to his left wrist and played the clickers like keys on a keyboard.

"This kind lets you talk to a whole group, not just the one or two that can see your hands," he explained to Carii when he noticed her curiosity. "Otherwise, you're limited to the long-distance language, which lacks the tonal subtleties and the complexity that goes with them. Of course, it's that much harder to speak."

"Couldn't some kind of translator synthesize those patterns?" she asked.

He smiled ruefully. "I've got one in my shuttle. The only problem is, the Baesk ignore it. Which is smart of them, in my book. Probably the only thing that's protected their privacy is the fact that you have to actually put yourself out to interact with them."

With that, he returned to his practice, and Carii drifted away. His last words were close enough to a rebuke that she felt vaguely guilty. But at the same time, she was annoyed that he would show so much sympathy for the Baesk, even now.

I guess you can't count on anyone—

The long ride had taken its toll on the party's boisterous belligerence. Time alone had served to dim the fire, but they were also tired. Under the stress, their unity of spirit had fragmented into a array of individual concerns. All that was left of their outpouring of mutual support was a smattering of tightlipped smiles and solicitous touches.

But when Daniel, taking his third shift driving, announced that they were

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

only thirty klicks away from the Baesk village, the energy started to build again. Carii retreated from it to the hammock, hoping her fatigue would allow a further retreat to sleep.

The best she could manage was dozing, but that at least saved her from having to pretend to take part or explain why she couldn't. And since she didn't know why she couldn't, that was a blessing. When she was awake, she snuck peeks at Rees, who was curled up in a corner with his arms crossed over his knees, his eyes alert, darting, attentive.

She seemed to be the only one aware of how he was watching them, as though he was gauging the slope of a rising curve. Then came a moment when his face seemed to change, as though an open door had closed.

Coming to his feet, Rees took a moment to strap the low-tech translator to his left hand. Then he called forward to the driver's cab, "Stop the crawler."

When he was sure he had been heard, he vaulted over the siderail with an easy motion, touched down lightly, and trotted ahead in pursuit of the other vehicle. On impulse, as the crawler lurched to a stop, Carii went over the tailboard and followed. Others trailed in her wake.

"This is far enough," Rees was saying when she caught up. "Any closer with these things and you're just going to frighten them."

"You know where we are?" Lonas demanded.

"I've been to this village before," Rees said easily. "I'll go down and find out what I can."

"No," Lonas said sharply. "I don't trust you, Rees. These are our kids. We're all going."

"The hell you are," Rees said calmly. "You want to take a dozen tired, jumpy, distraught people, half of them carrying weapons, into a touchy situation? You must not love your kid very much. I'll take one of you, *un*armed—"

"Take me," Carii said quickly.

"Now, just hold on a moment—" Lonas began.

"Who's got more right?" she demanded fiercely. "You had Krystal for eight years. All I had was three *months*."

There was an awkward silence, and Lonas avoided her eyes.

"Let's hold off on past tense until we see what's going on, all right?" Rees said lightly. "Come on, Mrs. Donovan."

As they moved downslope, leaving the crawlers behind, Rees pointed out to Carii the thick, deep-fissured bark on the trees. "The bark is full of fat little parasites called turtle slugs—kind of like snails. That's what the Baesk use their claws for most—to dig out a meal. They can climb, too, as fast as you could run the same distance."

"Do they live in the trees, then?"

"What? Oh, no. They use those big leaves as building material—they can scissor the first and second claws of the right hand. Darnedest thing I've ever seen. Takes off a stem thicker than your thumb in no time."

"Whose side are you going to be on when we get there?" Carii asked curtly.

He glanced sideways in surprise. "Yours, Carii."

They were very close to the Baesk

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

village before Carii saw it. She might have spotted it sooner had she listened to what Rees had said about the Baesk using the leaves as building material. Panels of umbrella leaves were stretched like curtains between adjoining trees to form the roofless enclosures which were the only structures the Baesk built. Dry and browned, the great leaves blended into the general background of the forest, providing a natural camouflage.

But when Carii started to ask Rees what enemies the Baesk had to hide from, he cut her off. Raising his hands before him, he hammered out a brief sequence on the translator. Belatedly, she became aware of the continuous chittering of claws carrying to them from the glade. She had no hope of sorting them out, but tried anyway, wondering how many voices she was hearing. Then she suddenly gripped Rees's elbow excitedly.

"Do you hear?" she breathed. "Do you hear them?"

Rees nodded, but she did not need his confirmation. There was no mistaking it: one of the sounds in the glade was the sound of children's laughter. They started walking faster. Though they passed several Baesk, some of them feeding just as Rees had described, they were not challenged. Drawing closer, they tracked the human sounds to the largest and greenest of the houses, and made their way to its entrance.

"Do you want to wait here?" Rees asked. "Just in case?"

Carii stared at him. "Are you kidding?"

They stepped cautiously through the opening. Scattered through the huge enclosure were eight or ten Baesk, and among them were several of the missing children. The nearest to them were a boy and girl who might have been twins except for their hair: hers black, his so blonde it verged on white.

"Krystal—are you all right?" Rees called out to the girl.

She raised her head from the game she was playing with pebbles and noticed them for the first time. "Sure. What's the matter?"

The bandy-legged blonde boy was looking their way now. "Eric?" Rees asked.

A nod and a puzzled look.

"And the little ones? Nobody's been hurt?"

"Nobody's been hurt," Krystal said. "Is Mom being a worrier again?"

Carii did not hear what answer Rees gave her. After searching the enclosure frantically with her eyes, she had at last found Darla, a tiny form asleep on a tanglegrass bedmat fifteen meters away. Sitting within arm's reach, as she always did when Darla slept, was Leth.

Carii took one step in that direction, but Rees caught her by the arm and stopped her.

"Easy," he said, gesturing.

She saw what he meant. Two of the Baesk were approaching them purposefully, claws beating out a message she could not begin to decode. Demand, greeting, or accusation—it could have been any of them.

"Hang with me," Rees said to her, and began his answer.

The conversation was long and, to her ear, agitated. She did not dare distract or interrupt Rees, though, and so stood by with barely contained impatience

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

One man's journey
to the new promised land...
and onto the trail
of a killer.

DOVER BEACH

BY

RICHARD BOWKER

BANTAM
NEW YORK • TORONTO • LONDON • SYDNEY • AUCKLAND
SPECTRA

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

until it was over. Stealing glances at Darla, glaring at Leth, Carii drove her anxiety level higher by the moment.

Finally the Baesk shuffled away together, and Rees turned back to her.

"They've agreed to let us have the children back."

Carii closed her eyes and let out the chill, poisoned breath she had been holding for two days. The breath that she drew to replace it was warm, sweet, and clean.

"On probation," he added.

Carii's eyes flashed open. "What?"

He gestured toward the bed where the sleeping child lay. "You can go get Darla now. I'll explain on the way back."

Their return to where the crawlers were parked caused a sensation. The moment they were spotted, they were mobbed and surrounded, a dozen voices demanding explanations.

"Look, she got her baby back—"

"Where's my boy?"

"Why didn't you bring them all out?"

"Are they all right? Is something wrong?"

In the midst of it, Daniel bulled his way to the front and reached for Darla. But Carii turned her back to him and retreated a step to where Rees stood between them.

"The children are all fine," Rees was saying. "In a minute I'm going to let you go down there one at a time to get your kids. You're going to get your nannies back, too."

"You're crazy," one of the women called. "Who wants one? I won't let it back in my house."

"You've got no choice," Rees said.

That quieted them in a hurry. Rees waited until all were listening before continuing.

"When this business started, I tried to get you to think about what you know about the people you leave your children with," he said. "Maybe what you should have been asking is what they know about you.

"Let me tell you what we found when we went into their village. They had built a house just for the children—the largest one in the camp—"

"So they were planning this all along," Lonas said.

"Shut up and listen," Rees said shortly. "The kids were clean, fed, happy. Every one of them had someone looking after them or there to play with them. The fact is, the Baesk were still doing the job you wanted them to do—only here, and around the clock. The fact is, they love those kids. It's not too much to say they cherish them."

"Hell of a way to show it," Daniel grumped.

"Actually, it's a beautiful way," Rees retorted. "You see, they took the children because they decided that you really didn't want them."

"That's idiotic," Joanne said. "Kids belong with their parents—"

"For better or worse?" Rees asked. "Do you remember a couple of days ago when you and Lonas were having an argument before dinner?"

Lonas frowned, but Joanne covered her mouth with a hand and grimaced.

"Krystal tried to say something to you and Lonas reached out and smacked her on the shoulder with the book he was holding. Like cuffing a dog. Then

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

when she cried, you sent her to her room, like it was her fault. Do you remember, Lonas? Shas does."

Without waiting for an answer, Rees turned on Daniel. "Two mornings back, Darla spit up while you were holding her. Do you remember what you did?"

"I—I gave her to Leth and went and cleaned up."

"I heard a different story. You got so angry you shook Darla like a rag doll, and then practically threw her at Leth."

"Carii—" Daniel said threateningly.

"She didn't see it, remember? She was in the Personal at the time. But Leth saw it." Rees turned to address the crowd. "The Baesk have a low birth rate. You'd expect them to treat every young one as precious,and they do. But all those good instincts are mostly frustrated. The females are only fertile once in their lifetime, for a few months.

"But their yearning to nurture a child never goes away. When you offered them a chance to care for your children, you gave them a gift of such value to them that you can hardly conceive of it. But then you started to show them that you didn't value the gift yourselves.

"They've got a catalog of a hundred little cruelties they've witnessed, and you're all in it. So they took over the job for you, like they'd take one of their own away from a neglectful mother.

"Maybe they're holding you to too high a standard—we're only human beings, after all. But the one accusation that sticks is that you've been selfish. And some of you that are trying to have it all are going to have to do some rethinking. Because the Baesk aren't just coming in to help out from now on. They're coming in to see that you behave yourselves."

"That's it—that's my speech. Your kids are waiting. From here on its up to you. Joanne, Lonas, you can go get Krystal now. When they come back, someone else can go."

After a moment's hesitation, the Millers took off together toward the Baesk enclave at a run, and the group fragmented as though a meeting had been adjourned. Rees started toward the crawlers. Carii, a playful Darla grabbing at her nose, moved to follow, but Daniel cut her off.

"I'm sorry," he said. "We'll work something out."

Carii regarded him with a level gaze, her head held high. "I've already worked it out," she said with chilling dispassion. "I'm going back to Stoneport."

"There's got to be a better answer than that," he said, voice quavering just the slightest bit.

She hesitated, the lost look on Daniel's face pleading with her to relent. That was impossible, for to do so she would have to unlearn or reject the hard lessons of the last two days. Even harder, she would have to forgive him.

"Better one parent that loves her wholly than two treating her like a nuisance," Carii said stiffly. "Leth taught me that."

Then she stepped around him and carried Darla away up the slope toward the crawlers, wrapping herself in a ferocity that defied him to approach her again.

The lightscreens on the family room bay were retracted, but for all that Carii's autistic eyes were seeing of the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

world outside, they might as well have been closed. She sat on the sill with knees drawn up near her chin and stared out into the compound, barely aware even of Daniel crossing before her on his way to the front door.

"Hi," he said tentatively, standing by the entryway.

Her answer was a listless echo.

Shaking his head, Daniel picked up the clacker from the sideboard and headed for the nursery. At the limits of hearing, she heard him tap out a clumsy greeting to Leth, then make happy gurgly noises to Darla.

He was making those noises a lot these days, and she resented every instance of it. She knew it was a show—guilt and appeasement and selfishness, trying to convince her and himself that he really was a good father, that he really cared for someone other than himself. But she knew better. He wanted a conscience at ease and a house at peace, and she was determined to deny him both.

Presently Daniel emerged from the bedroom with a thumbsucking Darla perched on one arm. "Do you have anything planned for dinner?"

She turned from the window and looked at him blankly. "No."

"Do you *want* any dinner?"

She shrugged and looked away again, and tried not to hear his sigh.

"Come on, Darlish," he said with false heartiness, "let's you and me go scout the kitchen."

Her withdrawal from him was petty and purposeless, a delaying action fought to stave off her inevitable surrender. But she could not give it up. If she could not win, she could at least deny him a chance to enjoy his victory.

And he had won. Three weeks after the kidnapping, she was still on Farley's World, homebound as ever.

Carii's determination to take Darla to Stoneport had lasted almost until the crawlers returned to the Frontier compound. But the long slow journey itself had defeated her. She had chosen to ride a different crawler back, enforcing the separation from Daniel. That meant that Darla's every need became a demand Carii had to meet.

By the time the Frontier compound came into view, the twenty-two unbroken hours of total responsibility for her daughter had Carii screaming for relief. When the families disembarked, she had made a beeline for Daniel, wordlessly handed him the child, and then ran away, knowing as she did that she was admitting she couldn't manage alone. She realized that she had been about to sentence herself to a life of frustrated ambition and unrelenting responsibility.

Insist on a better answer, she told herself for the thousandth time since that day. But she felt helpless to do so, knowing that her needs were last on the lists of everyone else involved.

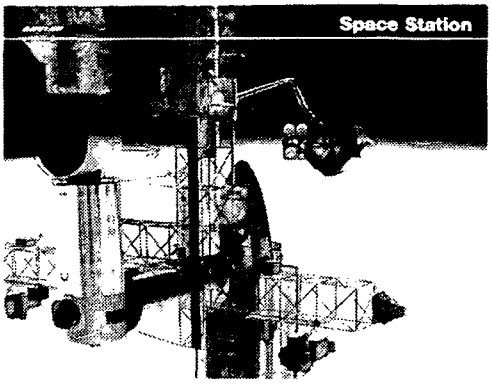
She stayed in the window through dusk and the setting of the small crescent moon, a mocking Cheshire-cat grin in the dark sky. Behind her back the rest of the household carried on as though she were the statue she appeared to be. Dinner was prepared and eaten, games played and songs sung, Darla bathed and bedded down.

When Leth was gone for the night, Daniel came back into the living room and stood with crossed arms by the hall-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

DO YOU KNOW YOUR FUTURE?

The National Space Society can help you learn about it.



Are you a person of vision? Are you anxious to make your views known? Did you know that there is a non-profit public interest organization, founded by the famed space pioneer Dr. Wernher von Braun, dedicated to communicating the importance of *all aspects* of a strong U.S. space program?

That organization is the National Space Society, and if you're a member, you'll receive:

- SPACE WORLD magazine. 12 big issues a year; tops in the field, following developments in manned and unmanned projects, national and international ventures, both current and projecting into the 21st century.
- VIP TOURS to Kennedy Space Center to witness Space Shuttle launches—thrill of a lifetime!
- REGIONAL MEETINGS/WORKSHOPS—meet an astronaut!
- DISCOUNTS on space merchandise—valuable books and memorabilia.
- Exclusive Space Hotline and Dial-A-Shuttle® services.
- and *much, much* more!

If you are that person of vision, excited about the adventure of space exploration, join the National Space Society today and help shape America's future . . . *your* future! To receive information on how to join, just fill in your name and address below. AND, just for asking, you'll receive our specially-produced leaflet, "Milestone Firsts of the Space Age," FREE!

NAME _____

ADDRESS _____

_____ ZIP _____

". . . promoting development of the final frontier"

National Space Society

600 Maryland Ave., SW #203W
Washington, D.C. 20024
(202) 484-1111

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

way, studying Carii critically. She could feel his disapproval even before he spoke.

"How much longer are we going to go on like this?" he asked quietly.

Her answer came out more curt than she intended. "Fourteen months," she said without looking at him. "Isn't that how much time is left on your contract?"

He shook his head. "Brewer—you remember Brewer?—Brewer stopped me the other day. He wanted me to tell you that he admired you for putting Darla first, for setting your career aside to see that she was taken care of."

He frowned and shook his head again. "But the fact is, you're not even doing that well. I guess I can understand you still being angry with me. But I don't understand what grudge you've got against your daughter. If sulking is the best you can do, maybe you ought to go back to Stoneport after all. Darla and Leth and I will manage here."

Carii had to examine his words twice before she realized what he was saying. When she did, she turned toward him with a look of bewilderment and hurt. But by then he was already gone, having disappeared down the hallway and into the bedroom.

She did not follow. She sat in the window and cried until she was embarrassed by her own weakness. Pride dried the tears, and from that point forward she sat and thought hard about that elusive better answer.

But it was only when she realized she had been asking the wrong question did a glimmer of hope arise. It sent her running to the omnicom to page her Rheinchem shift supervisor.

"Mr. Makinnon, this is Carii Donovan. I wonder if you could make time in your schedule tomorrow to talk to us about our situation?"

The next day, Daniel met Carii at end-of-shift in the lobby of the management suite, as she had asked.

"Thank you for coming," she said.

"Yeah, well, I hate going home to an empty house," he said. He looked past her to where Leth sat and made a silly face at Darla, who was standing wobbly-legged on Leth's knees. "How'd you get her over here?"

"Shuttle, of course."

"I'll bet that caused a sensation. What do you want from me in there?"

"You don't have to say anything. I only want you there to present a united front. I don't want him to think he can humor me and then take you aside and get you to talk me out of it."

"Talk me out of what?"

The lightbar by the door flashed green and a voice addressed them: "Mr. and Mrs. Donovan?"

"Yes, Mr. Makinnon," Carii said brightly.

"You can come in now."

"Thank you," she said. "It doesn't really involve you," she said to Daniel. "All I ask is that you don't stand in my way." Gesturing to Leth to follow, she turned and pushed open the door.

With chair tipped back and hands folded before him, Abram Makinnon sat behind his desk like a man comfortably in control. Carii saw at once that he had no intention of giving her anything, that he felt obliged to talk to her but not to deal with her.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Which is why she so enjoyed the look of pure surprise—tinged with just a little fear—which seized his face when Leth followed her through the door.

"Now, wait a minute," Makinnon said, coming up out of his chair. "I agreed to see you and your husband—"

"Darla's a party to this. She belongs here," Carii said simply.

His reaction told her that he had not even noticed Darla cradled in the arms of the auburn-furred Baesk. He looked from Darla to Carii to Leth, shot a questioning glance at Daniel, then back at Carii. "All right," he said finally. "But *that* thing will have to wait outside."

Carii settled back in a chair. "Fine. You tell her."

"What?"

"The *thing's* name is Leth. I consider her a friend, and she's also a party to this. On top of which I don't think Leth wants to leave. If you want her out, you're going to have to explain it to her yourself."

"I don't even know how you talk to it," he protested.

Carii gestured, and Leth settled into a chair along the back wall. "Then I guess she's staying."

Disconcerted, Makinnon retreated to his chair and tried to avoid looking at Leth. "What did you want to talk about, Mrs. Donovan? You said something about your situation—"

"I want to work. You brought me here to work. I'd like to find some way for us both to get our needs met."

"I thought you'd have learned your lesson the first time, Mrs. Donovan, with the close call—"

"I did. The lesson was not to be too greedy. I want to talk about job-sharing."

"I'm sorry. That's not possible."

"It's perfectly possible. Look, all you would have to do is stagger half the slots on each shift four hours and add a midshift shuttle run. That would give you all kinds of flexibility for halftime and overtime—"

"Mrs. Donovan, please save your energy. Rheinchem's management policy is foresquare against any form of job-sharing—"

"That discriminates against families."

"Rheinchem has every legal right to establish reasonable employment conditions which accord with its operational needs. And hours are part of conditions. It was all in the contract you and everyone else here signed." He risked a glance at Darla, then continued. "Listen. I've got nothing against kids. I've got a wife back at Stoneport looking after two of them. This just isn't the place for them."

"If this was Bibai or Montpel or Tirah you'd have to offer job-sharing. I looked it up last night—"

"There's a lot of worlds where the employment regs make it hardly worth setting up business. Farley's World's not one of them, thank heaven."

"But if it works there, I don't see why it can't work here."

"Then let me point it out to you, Mrs. Donovan. You're living at the wrong end of a long supply line. And we're paying the freight. Frankly, I feel as though the company has been generous in allowing you and your daughter to continue living here at no cost."

"Some favor—"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"I understand that you're not entirely happy with the situation. What you don't understand is that we don't *want* you entirely happy. Rheinchem runs lean. We don't want a community of four hundred people and only two hundred workers. We don't want to have to think about schools and child-care. We're not social workers, Mrs. Donovan. This is business, and you're not an asset anymore. You ought to just be glad that you've got the Baesk to take the heat off you."

"I don't want the heat off. I want a chance to be everything I am."

"Then you should have signed with someone else," Makinnon said unsympathetically.

Carii felt herself beginning the long slide down into despair. She stared at Makinnon disbelievingly, as she would at someone standing by sipping a drink while another person drowned. *You don't care what's fair or right or even reasonable—*

"So you're saying it's an economic decision," Daniel was saying.

"That's right. There's nothing in it for us."

Maybe Daniel was right. Maybe I should just leave Darla here with him. What kind of parent would I be, feeling like this? I can't take another year like these last months. Not and be any use to anyone—

"But I think you've missed something, Mr. Makinnon. We're already here, right? You're paying the freight for Carii and not getting anything out of her. Nothing out of her talents. Nothing out of her training, some of which you also paid for."

"I didn't say we were happy with the status quo."

I could get assistance on Stoneport, but not a job. Not an extraction job. Just an idiot by-the-numbers job. A job hardly worth having, much less sharing. Oh, god—maybe I just ought to take a dive into the crusher. Then Daniel and Darla would at least get some benefit out of my death—

"Then think about this," Daniel went on. "Two people putting in three days a week each. You get six days work. You pay them five days wages—half the base each. What does that do to your overhead? Does one worker-day's production pay the extra cost for a worker who's already here?"

What was Daniel talking about? Carii roused herself from her black musings and tried to gather up the thread of the conversation. Two sharing six?

"Hmm." Makinnon pursed his lips and tipped the computer workslate toward him. His fingers danced, and he clucked. "This is something we might want to look into further," he said at last.

"Then please do."

"Except she's got no one to share with. Everybody else in the team is working full shifts. I promise you, there's nobody who wants some extra free time enough to chop their checks in half. Or do you know someone else who's pregnant? Who's going to share with her?"

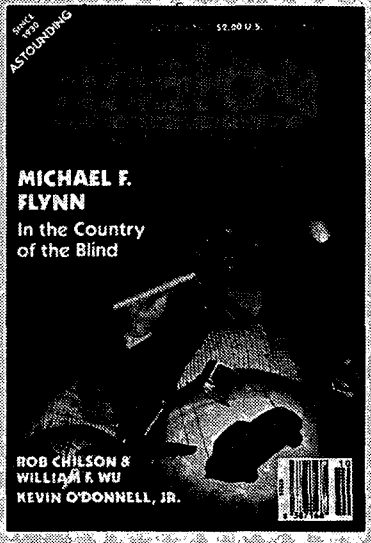
Daniel glanced sideways at Carii before answering. "I am."

She stared at him in wonder and mouthed the words, "Are you sure?"

Flashing a quick smile, he nodded. "Yes."

LICENSED TO UNEXRG
ELECTRONIC REPRODUCTION PROHIBITED

THE PAST, THE PRESENT, THE FUTURE, THE UNKNOWN.



SUBSCRIBE NOW AND SAVE 25% OFF THE COVER PRICE

CALL TOLL-FREE 1-800-247-2160

(Iowa residents Call 1-800-362-2860)

☐ Please send me 18 issues of ANALOG SCIENCE FICTION/SCIENCE FACT MAGAZINE for only $26.97—I save 25% off the newsstand price.

☐ Please send me 8 issues for only $11.97.

Mail to: **Analog**
P.O. Box 1936
Marion, OH 43305

Name _____

Address _____

City _____

State _____ Zip _____

☐ Payment Enclosed ☐ Bill Me

☐ Charge (Circle one) MasterCard VISA

Card# _____

Exp. Date _____

Signature _____

OUTSIDE US & POSS., 8 for $13.97, 18 FOR $29.97 (CASH WITH ORDER US FUNDS). PLEASE ALLOW 6-8 WEEKS FOR DELIVERY OF YOUR FIRST ISSUE.

DAL7A-2

LICENSED TO [illegible]
ELECTRONIC REPRODUCTION PROHIBITED

Her whole being radiated gratitude and relief. *I misjudged you. You are real*, she thought fervently. *The better answer is the one we make together. Oh, god, Daniel, I love you.*

But Makinnon would not let it go, would not let Daniel surrender that which he himself would never yield. "I don't think you've thought this through, Daniel. You have nothing to gain—

"You're wrong, Abram," Daniel said quietly as he reached for Carii's hand. "A daughter—a wife—a life after Rheinchem and Farley's World. I have everything to gain, Abram—and nothing to lose." ■

IN TIMES TO COME

By now you've probably heard good things about a relatively new writer named Lois McMaster Bujold, and next month she makes her *Analog* debut in a big way: with the four-part serial *Falling Free*, illustrated by Vincent di Fate. Much of what human beings do in space will be most conveniently done in free fall, but human beings are not really very well adapted to working in free fall. With the capabilities now being developed by workers in genetic engineering, though, they *could* be—and if industry moves into locales outside the jurisdiction of government with current Earthly biases, chances are quite good that they *will* be. But if a company makes a large investment in developing workers well suited to a special environment, are those workers company property or independent individuals? That may depend very strongly on whether you ask them or management, and therein lies a tale....

Our fact articles are usually about developments on the present frontiers of research, and only seldom reviews of work done some time in the past. But once in a while there's a special reason to take a look back at what earlier scientists have done, if only for the insight such a retrospective can provide into how science really develops. Such a case is our December article by Dr. John Gribbin, "The Lost Years of Cosmology." New writer Pat Forde's novelette "The Gift" was not planned as a companion piece to Gribbin's article, but they do compement each other rather nicely.

Barring last-minute glitches in scheduling, we'll also have new stories by Christopher Anvil and the well-established team of Rob Chilson and William F. Wu.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Tony Rothman

A MEMOIR OF NUCLEAR WINTER

The nuclear winter concept created quite a stir which has now largely passed. Why did it come, and why did it go?

Author's Note: This article was originally completed in a longer form in early 1985 but withheld from publication. As a result, many of the finer points are now dated. For this version I add a postscript to clarify a few details and discuss more recent developments.

I

On October 30th, 1983, a *Parade* Magazine article by Carl Sagan introduced Americans to a new form of apocalypse called nuclear winter. With his article, Sagan had hoped to alert the public to a danger he felt real and relevant to our thinking about nuclear war. Everyone knows how successful he was. The vision of Earth slowly freezing under a twilight sun has found a place in our nuclear nightmares, somewhere beside that of Slim Pickins riding the H-bomb to Armageddon.

This article is also about nuclear winter but I will not be concerned so much with the scientific details as with the scientific community. It is also a brief chronicle of some experiences I have had with a group of scientists who dedicate much of their lives to the prevention of nuclear war. In the old chronicles, the monk-storyteller would always begin with a disclaimer that he was "too witless to embellish or ornament the truth" and then go on to describe miraculous and unbelievable events. The immediate result of the disclaimer is that you don't trust a word he says. So I won't make one. Nonetheless, I will try to stick as closely as possible to events that I have witnessed firsthand. You may regard my perspective as one of a scribe who sits at the feet of the participants in the story. If there is something he didn't see, he gets a report from the players. Occasionally he stands up to take a small part.

I shall make my position clear at the outset: As far as anyone can estimate, a full-scale nuclear exchange would kill between 600 million and one billion

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

people outright. For me the necessary calculation has been done; the possible annihilation of one-fifth of humanity and the collapse of civilization are sufficient reasons to prevent nuclear war.

The magnitude of such numbers is not easily imagined. This is, to a great extent, why the nuclear winter campaign has been so successful. The aftermath of a nuclear war now becomes much more vivid. One billion is merely a one followed by a string of zeros. Nuclear winter is an apocalyptic vision. Whether the prophesy proves correct is another question, but it is precisely the sort of apocalyptic vision that has seduced the darker side of the human imagination at least since the Revelation of St. John. To be successful, an apocalyptic vision must be swift, simple, and dramatic. Nuclear winter satisfies all three criteria. Nothing swifter in the way of current warfare can be imagined than a nuclear exchange between the United States and the Soviet Union. The idea is perversely simple. Dust kicked up by the explosions and soot injected into the atmosphere by subsequent fires would virtually extinguish sunlight for months on end. And the end is dramatic. Temperatures would drop to subfreezing levels on a global scale for a time sufficiently long to threaten all remaining life on Earth with extinction.

II

The history of this apocalypse depends upon who tells it. In 1982, Paul Crutzen and John Birks published the first estimate of the amount of soot which might be injected into the atmosphere from forest fires ignited during a nuclear exchange. Their paper appeared in a special issue of *Ambio* devoted to the global consequences of nuclear war. *Ambio* is a journal published by the Royal Swedish Academy of Sciences and the entire special issue has been reprinted by Pantheon Books under a new title *The Aftermath*. To estimate the amount of soot released by forest fires during a nuclear war is a thankless task. You require many inputs, some of which can only be guessed: the area burned, the fuel available in forests, the amount of smoke emitted per kilogram of fuel burned and so on. The Crutzen and Birks calculation was very simple—what we call a back-of-the-envelope calculation—but it had the virtue that it directly reflected the uncertainties in their inputs. They concluded that noontime sunlight would be attenuated by a factor between two and one hundred-fifty. A light cloud cover attenuates sunlight by more than a factor of two, so at the lower end of Crutzen and Birks' estimate you would not expect a large climatic effect. If the upper end were more likely, the result would be disastrous and a nuclear winter would surely result.

Under a nuclear attack you would of course expect cities to burn as well as forests. The data on urban fuel availability was, however, insufficient for Crutzen and Birks to make any estimate whatsoever of city smoke emissions, but they guessed that the amount of city smoke should be comparable to that of forest smoke. If this were true, the likelihood of a nuclear winter would be greatly increased. The central message of Crutzen and Birks' paper is that the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

potential for climatic change exists and this conclusion is difficult to avoid.

In October, 1983, the Sagan article appeared in *Parade* and two months later the now-famous *Science* paper "Nuclear Winter: Global Consequences of Multiple Nuclear Weapons Explosions" by Richard Turco, Brian Toon, Thomas Ackerman, James Pollack, and Carl Sagan. The paper is usually referred to as TTAPS, sometimes, and not without irony, as "*et al.* and Sagan." The TTAPS calculation coupled a nuclear war scenario to a one-dimensional computer model of the earth's atmosphere. The real atmosphere is three-dimensional and to properly model it requires a three-dimensional simulation. Three-dimensional computer codes are, however, complex and costly and the TTAPS group began as all scientists would by simplifying the problem as far as possible. They took the atmosphere to be a one-square centimeter column of air above the earth's surface. This approach ignores many effects, such as wind, but is useful as a first approximation to what might actually occur in the real atmosphere after a nuclear exchange. The computer code allows the modeler to adjust the input parameters, such as the area burned under an attack and the fuel consumption, the same sort of quantities necessary for the Crutzen and Birks calculation. The nuclear war part of the code then generates soot and dust which enables the atmospheric model to calculate the expected temperature change on the planetary surface.

Even in their less severe scenarios, the TTAPS results showed temperature drops to far below freezing. I will talk more about a few of the scenarios as we go along, but for now these details are not crucial. The important message of the TTAPS paper was brought home in a companion article by Ehrlich, Harwell, Harte *et al.*, entitled "The Long-Term Biological Consequences of Nuclear War." If the TTAPS conclusions were correct, the aftermath would be a global disaster. Any survivors of the initial holocaust would witness widespread extinction of plant and animal life and their own extinction would not be ruled out.

In late 1983 and early 1984, a number of other studies were published or distributed that evidently confirmed the TTAPS conclusions. Principal among these were a Lawrence Livermore Laboratory report by Mike MacCracken, who performed both one- and two-dimensional simulations; a USSR Academy of Sciences preprint by Vladimir Aleksandrov and Georgi Stenchikov, who presented a summary of their three-dimensional model; and a *Nature* article by Curt Covey, Stephen Schneider, and Starley Thompson of the National Center for Atmospheric Research (NCAR), who also reported the results of a three-dimensional simulation.

The apparent confirmation of the TTAPS calculations has led to a number of public statements, notably by Sagan and Ehrlich, that imply the TTAPS predictions are "robust" and that further research will only make them worse. Robust, in the scientific sense, has much the same meaning as it does in other contexts. A result is robust if you can kick it, hammer at it and drop it from

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

a great height and it will not break. At the moment I am chronicling history so I do not pause to debate the robustness of the TTAPS results. The claims of Sagan and Ehrlich, however, raise two questions. The first, and least important, is scientific: Why did the Crutzen and Birks calculation indicate outcomes that varied from mild to severe, while the subsequent calculations all pointed to catastrophe? The second question has a relevance far beyond the realm of nuclear winter: What constitutes scientific confirmation and to what extent may any protagonist construe lack of public rebuttal as assent?

The history of nuclear winter as I have just presented it is similar to versions found elsewhere in the popular literature. But I am less interested in history than in prehistory, that which has gone before. And I am less interested in prehistory than in nonhistory, that which has vanished into lapses of memory and under the weight of words.

Any subject is antedated by prehistory and surrounded by nonhistory, a fact as true in science as politics. There are many reasons for this but basically a result is always more impressive when it is new and shiny than when it is dimmed by the shadows of forgotten ancestors. Although Sagan in his *Parade* article indicates that nuclear winter research was inspired by his and his colleagues' study of Martian dust storms, and Ehrlich in his *Amicus* article of 1984 credits himself, his wife and John Holdren for first considering the ecological effects of nuclear war, both priority claims are somewhat belated.

In 1963 Tom Stonier published a book *Nuclear Disaster* of which several chapters were devoted to the ecological consequences of a nuclear holocaust. At about the same time, a Hudson Institute report on the same topic by R.U. Ayres was in preparation, and in 1966 there appeared a Rand study by E.S. Batten dedicated to the "popular question, 'does the detonation of nuclear weapons affect the weather?' " Many of the effects currently under investigation are discussed in these works. All try to estimate the amount of dust that would be injected into the stratosphere as a result of a full-scale exchange and the subsequent cooling. (The Rand study considers the temperature drop due to soot from forest fires as well.) The cooling estimates are made by comparing the amount of dust injected with that of a major volcanic eruption. Similar estimates for individual atomic tests date back at least to 1955. Whether the "volcano analogy" is relevant to nuclear winter has been debated but it is naturally the first thought that pops into any scientist's head. Indeed, the first suggestion that volcanos might cool the Earth's atmosphere was apparently made by Benjamin Franklin. Credit for the first calculation that predicted from basic principles the temperature drop due to a volcanic eruption is usually given to Humphreys who derived his result in 1913. It can be found in his classic text *Physics of the Air*.

I want to emphasize that none of these studies were very quantitative or came to many solid conclusions. Indeed, Batten ends by saying "large climatic impact is possible but its magnitude is

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

unknown." In any case, all these works sank into oblivion. Sagan, Ehrlich, and their colleagues must therefore be given large credit for bringing the potential apocalypse of nuclear winter before the public's attention. But few ideas spring wholly formed from the head of Zeus. That the early studies did not make detailed calculations is not so important. Calculations are plentiful while ideas are few. TTAPS reference a few of these precursors to nuclear winter in their unpublished drafts. They would not be due any less credit if they mentioned some of these lost works in public, or even hinted at their existence.

III

I am now going to leave the catacombs of prehistory and nonhistory and begin a chronicle of more recent events. Since these events are closer to personal experience, I will simply tell the story as I saw it.

My own nuclear winter education began when I returned from a year in the Soviet Union. Not being able to find a single Russian who was aware of the vast civil defense network that American experts claim can evacuate Moscow in two days, I decided to use my experience and training for the cause of peace. The Russians have a saying, "If you call yourself a mushroom, then jump into the basket." At home a friend suggested that I contact the arms-control group at Princeton University's Center for Energy and Environmental Studies. I took his advice.

CEES, as the Center is called, is housed in the von Neumann building at the far edge of campus. Fifteen years ago, the same building was occupied by the Institute for Defense Analysis. Protests following the bombing of Cambodia led to IDA's removal from the university and its eventual replacement by CEES. This irony is not lost on CEES staff who form a multi-disciplinary and admittedly liberal corps devoted to solar energy research, hazardous waste disposal, energy-efficient architecture, and arms control.

The arms-control group, like the Center in general, is a haven for physicists who have developed a social conscience. Frank von Hippel is an ex-particle physicist who until 1984 served as the elected Chairman of the Federation of American Scientists, a lobbying organization devoted to nuclear disarmament. Barbara Levi, a research staff member, is also an ex-particle physicist and Hal Feiveson, while now a political scientist, has a physics background as well. Historian Richard Ullman of Princeton's Woodrow Wilson School for International Affairs, is their close collaborator. Although they will undoubtedly find it highly presumptuous of me, I will refer to this band as the "World Savers."

The World Savers consider their job to be twofold. First, they are actively engaged in understanding the technical aspects of nuclear policy and arms control. Reactor safety studies, the global control of plutonium and the effects of limited nuclear war are among the subjects dealt with by the World Savers. The second part of the World Savers' job is based on an acknowledgement of a responsibility to communicate their results to policy makers and to the gen-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

eral public. The World Savers frequently give public lectures, contribute technical and popular articles to a number of magazines and testify before Congress.

My introduction to the concerns of the World Savers was largely through their weekly lunch seminars. Topics that range from anti-submarine warfare to the military strategy of World War I to the problem of succesion in the Soviet leadership are discussed over hoagies. In addition to CEES World Savers, other World Savers are frequent participants: Nobel Laureate Philip Anderson from the physics department; Freeman Dyson of the Institute for Advanced Study, and a host of political scientists, activists and military commanders. The seminars are always lively, sometimes contentious and often continue for hours.

Shortly after I began to visit the Center on an informal basis, the nuclear winter story broke in *Parade* Magazine. The following day The Conference on the Long-Term Biological Consequences of Nuclear War opened in Washington D.C. where Sagan and Ehrlich officially announced the results of the TTAPS study. While Frank von Hippel in particular had known something was up, it is fair to say that even the World Savers were surprised at the magnitude of the publicity and that the results were first published in *Parade*. Other than forgotten precursors and the Crutzen and Birks article, no scientific paper on the subject had yet appeared. This put scientists in an awkward position. Within days, friends and laymen began to ask for our opinion on the subject and we could not give an informed response.

Later that same week a preprint of the now-famous TTAPS *Science* paper arrived from Washington. Several aspects of this preprint puzzled us. TTAPS had taken as its "baseline" a 5,000 megaton exchange of which 1,000 megatons were targeted against cities. The baseline case changed the average temperature of the northern hemisphere from roughly 15°C to −20°C, a 35° drop. It is this scenario which has given rise to the term "nuclear winter" and the vision of ruined cities that lie beneath crimson skies and swirling snow. But at the same time TTAPS presented a "city attack" in which a total of 100 megatons directed against cities gave essentially the same result as the baseline case. It is this scenario which has often been termed the "threshold" scenario and given rise to speculation that even 100 megatons, or a limited nuclear war, could trigger nuclear winter. We asked ourselves how a 100 megaton exchange could produce virtually the same effect as a 5,000 megaton exchange and could not find an obvious answer; in the TTAPS preprint there is no explanation. Generally, the *Science* paper is a summary of results. Any explanations were to be found in reference 15, the longer version of their paper, which I had not been shown at the time. Reference 15 remains unpublished.

During roughly the same period, Barbara also received a copy of the Soviet nuclear winter study headed by Aleksandrov. Although the paper is not readily available, Aleksandrov presents the main results in the recently published

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

book *The Cold and the Dark*, which constitutes the proceedings of the Washington conference. Certain aspects of the Soviet investigation were unclear as well. In particular, their results showed that, after a year, the atmosphere would heat up beyond the original temperature almost as much as it cooled down. Figure 8 of their paper, which shows this overshoot, is not presented in *The Cold and the Dark*. After my year in Russia I was also interested to see that not only was the Soviet model based on a 1971 American computer code, but that every reference in the paper, with the exception of one to their own work, was to an American source.

The only way out of an information vacuum is to pretend you are an expert or become one. The World Savers are not politicians and thus chose the second option. To begin the education process, Jerry Mahlman was asked to give a seminar on nuclear winter. I was invited to sit in. Mahlman is an atmospheric physicist who has recently been appointed Director of the National Oceanic and Atmospheric Administration's Geophysical Fluid Dynamics Laboratory, located at Princeton University. He had also participated in a private conference on nuclear winter held in Cambridge, Massachussetts the previous April and was on the review board of the National Academy of Sciences nuclear winter study which was then in the works. Mahlman stressed that he held great respect for the abilities of Turco and his colleagues—"these guys aren't amateurs"—but severely criticized a number of the assumptions that went into the TTAPS model. He also introduced us to the work of Mike MacCracken at Lawrence Livermore Laboratory who, as I have said, was engaged in similar calculations. By the end of the seminar we were not experts, but it was apparent that the TTAPS results were preliminary and much room was open to scientific criticism.

We were further educated in early December, 1983, when a Soviet arms-control delegation arrived in Princeton to meet their American counterparts. Among them was Aleksandrov. In *The Cold and the Dark* Aleksandrov claims that the Soviet results are "the same" as the NCAR conclusions and, by extension, those of TTAPS. In conversations with scientists he is much more frank about the limitations of their computer model. He acknowledged from the start that the temperature overshoot I mentioned is an artifact of their model, not of the atmosphere. This fact is not reported in *The Cold and the Dark* either. I don't want to make too much of the overshoot; I simply feel that mistakes should be reported along with successes.

IV

In late spring, 1984, Frank von Hippel asked Barbara and me to spend the summer reviewing the nuclear winter calculations in order to educate the World Savers and to arrive at whatever conclusions we could. Until this time I had been merely a frequent guest at the Center. Now I became a temporary World Saver.

In making his request, Frank expressed a concern that many scientists

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

have had about the nuclear winter publicity from the beginning. If nuclear winter should turn out to be nonexistent, or even less severe than claimed, the effort to mount a disarmament campaign on it could backfire badly. The credibility of scientists would be damaged and the disarmament movement as well.

For this reason, many liberal scientists feel the safer course is to check the nuclear winter calculations themselves, rather than leave the job to the Pentagon and to the extreme right. You may ask why political leanings should bias scientific objectivity. It is a very good question.

The Center did not have a large computer model at its disposal so our job was to some extent secondary. When a field expands as rapidly as nuclear winter, new papers appear almost weekly and, in this case, most were unpublished. Nevertheless, I think Barbara and I managed to read almost every word written on the subject; we checked calculations and did our own such as we were able; we spoke to many specialists around the country and invited several to give talks at the Center.

It quickly became apparent that a scientific consensus on nuclear winter does not exist. Unless it is a consensus not to have a consensus. I have rarely seen such an intense debate over a scientific topic. There was no point not open to dispute.

One question, however, was answered by the published version of the TTAPS *Science* paper which appeared at the end of 1983: How did a 100 megaton city attack produce essentially the same results as the 5,000 megaton baseline attack in which 1000 megatons were targeted against cities? This city or threshold scenario has received much public discussion and is worth a few words. In *The Cold and the Dark* Sagan writes:

> Perhaps the most striking and unexpected consequence of our study is that even a comparatively small nuclear war can have devastating climatic effects, provided cities are targeted (see case 14 in figure 2; here the centers of 100 major NATO and Warsaw Pact cities are burning). There is an indication of a very approximate threshold at which severe climatic consequences are triggered—by 100 or more nuclear explosions over cities [in terms of smoke generation] . . .

There is no further explanation in the text or in the figure captions. Nonetheless, Ehrlich repeats Sagan's statement almost verbatim and speculation on the existence of a nuclear winter threshold has found its way to television and the *New York Times*. Unfortunately, Sagan's account of the TTAPS results is both misleading and incorrect. A close reading of their paper shows that, for the threshold attack, the 100 megatons are assumed to be distributed over 1,000 city centers, not 100. Because city centers contain more potential fuel than suburbs or forests, such a distribution targets only the highest fuel sources. Sagan also does not mention that the amount of smoke emitted from each city-scenario target was taken to be about five times the value used in the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

baseline case. The selective targeting plus the fivefold increase in smoke emissions brings the total threshold smoke up to sixty percent of the baseline smoke. That the threshold and baseline scenarios produce similar climatic effects is not surprising; the only surprise is the term "threshold" to describe the situation. A correct version of Sagan's statement might read: ". . . a comparatively small megatonnage can have devastating climatic consequences provided 1,000 city centers are targeted and smoke emissions are five times higher than our baseline values." I have replaced the words "small nuclear war" by "small megatonnage" because an attack on 1,000 city centers targets essentially every city in the United States, the Soviet Union and East and West Europe with populations over 100,000. This is not a limited nuclear war.

For the purposes of this essay I need not go into further specifics of the TTAPS scenarios. The results of our survey indicated that, within the limits of current knowledge, almost any answer was possible. The nuclear winter calculations were not robust. This is not to say that nuclear winter is ruled out, nor does it mean the TTAPS calculations are wrong. It means simply that I could pick assumptions and data which are as valid as the TTAPS choices and nuclear winter would essentially vanish. Reports from the nuclear winter conference held in Erice support this contention. After examining as much data as we could find, the predictions did not become any more accurate than those made by the original Crutzen and Birks calculation.

I have chosen the word "accurate" deliberately. The TTAPS and subsequent calculations are much more precise than the Crutzen and Birks calculation but this is not the same time. In my undergraduate physics laboratory, a cartoon hung on the wall that showed a disgruntled archer facing a target where five of his arrows have all landed in a very tight cluster on the outer ring—far from the bull's eye. The caption read "Precision is not accuracy." A computer can make an answer more precise; it cannot make it more accurate. And Batten's conclusion of 1966 remains true today: "Large climatic impact is possible but its magnitude unknown."

It is just this uncertainty that should alarm us; to the extent of our knowledge almost anything could happen in the wake of a nuclear war. A result that is not robust may certainly turn out to be wrong. But it could also turn out to be right, or nearly so. For this reason I do not want to sound optimistic. The 1815 eruption of Tambora produced an average temperature drop around the globe of less than one degree. This is far from a nuclear winter but the results were disastrous. Cold snaps in June of the following year led to crop failures and widespread famine. It is not inappropriate that 1816 is remembered as "The Year Without a Summer." A technical debate over whether the final answer will be 5° or 35° is important if you are worrying about disaster versus extinction. It is important for scientists who are trying to understand whether one

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

study confirms another. It is also important for those who worry about the political side-effects of exaggeration. But it is not so important if you believe that even a 1° temperature drop is unacceptable.

So, the response to the nuclear winter calculations depends on the question you are asking. I have claimed the calculations are not robust; others claim they are. As a scientist seeking truth and worried about credibility gaps, the resolution of this dispute interests me intensely; as a person opposed to nuclear war on first principles, the resolution is somewhat more academic. But let me continue for a moment as a scientist and ask again the question I asked before: to what extent is it meaningful to say the results of one calculation confirm those of another? Though I pose the question as a scientist I would like it to have broader applicability than to nuclear winter alone. In setting it, I am not really interested in whether the TTAPS results are robust or whether they are not. I am interested to discover on what basis a claim for robustness can be made.

Sagan believes the TTAPS calculations have been confirmed. In his *Foreign Affairs* article, which appeared early in 1984, he writes:

> The new results have been subjected to detailed scrutiny, and half a dozen confirmatory calculations have been made. A special panel appointed by the National Academy of Sciences has come to similar conclusions.

The scrutiny to which Sagan refers includes not only a standard review of the *Science* paper before publication but a closed conference held in April 1983, six months before the results were announced in *Parade*. The expressed purpose of this conference was to examine the TTAPS calculations. First let me take up the confirmatory studies. These include the NCAR work by Covey, Thompson, and Schneider; the Aleksandrov and Stenchikov model; and MacCracken's Livermore model. I do not know to what others Sagan refers.

The TTAPS baseline case produced a temperature drop of 35° and the other studies predicted about 20°, 20° and 8° respectively. In quantum electrodynamics a factor of four would not be regarded as confirmation; it would be regarded as a dispute. Climatology is a much less exact science and it is to some extent a matter of taste whether one regards 8° as a confirmation of 35°. To be fair, I should mention that TTAPS estimated that the effects of oceans might reduce their calculated temperature drop by 30 to 70 percent, which would put the answer in the same ballpark as the others. By the same token I should add that the NCAR results only showed the 20° change if the nuclear exchange occurred in summer. If the presumed exchange took place in winter, the NCAR simulation strongly suggests a very small effect of at most a few degrees. This also appears not to be reported in *The Cold and the Dark*.

But in this discussion the essential point lies elsewhere. Some problems are such that no matter what inputs you choose, the output remains unchanged. The nuclear winter calculations are not

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of this type. The final answer depends very critically on the input values, for instance on the amount of smoke assumed to be injected into the atmosphere. If the quantity of smoke turns out to be ten times less than TTAPS used, nuclear winter will essentially disappear. The confirmatory studies all took as an input the amount of smoke given by the TTAPS baseline case. The results are certainly robust in the sense that, given this amount of smoke and given that it remains in the atmosphere for the amount of time TTAPS claim it does, something drastic will happen to the earth's climate. The major uncertainties, is this amount of smoke likely and will it stay in the air for months, have simply not been addressed by the confirmatory studies. The recent calculations all converged to the upper end of Crutzen and Birks' estimate first because they added the effects of cities and, second, because they took smoke emission to be in the higher regime of allowed values. Precision is not accuracy.

Memory is not always accurate. Nevertheless, I believe Einstein once said, "You should make things as simple as possible but not too simple." The Earth's atmosphere is extremely complex and the nuclear winter models are very simple. We can be sure that whatever happens will be much more complicated than what has so far been predicted. In at least one nuclear winter model Einstein's dictum has been violated, if unintentionally. I have already mentioned that the temperature overshoot in the Soviet model was due to severe computer constraints. In addition, Aleksandrov and Stenchikov accidentally gave dust the optical properties of soot. Because soot absorbs light much more effectively than dust, this error overestimates the reduction of sunlight reaching the Earth's surface by a large factor. In a recent issue of *Science*, the Soviet model received some harsh, if accurate, words from Richard Turco and Starley Thompson. Both go on to say that the Soviets have contributed little to the international nuclear winter program. Be that as it may, it is scientifically unwise to regard the Aleksandrov and Stenchikov results as strong confirmation of any other study and I find it ironic that Sagan continues to do so while his principal coauthor does not.

Degree of confirmation is, as I have indicated, largely a degree of taste. One could argue that the Soviet study does weakly lend support to the TTAPS conclusions. I am willing to accept this point of view even if I do not subscribe to it myself. Each of us draws the line where his instincts prohibit further retreat. In my own case, the line is drawn before citation of the National Academy of Sciences/National Research Council Study.

At the time Sagan's *Foreign Affairs* article appeared, the NAS/NRC preliminary draft had not been passed by the review committee.* It was confidential and not to be quoted or cited. In any case, the two principal authors of the TTAPS paper were members of the NAS drafting team and the NAS report

I have recently been informed by a panel member that it had yet to be written.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

relies so heavily on the TTAPS results that it is difficult for me to regard it as an independent investigation.

As it happens, the final version of the NAS/NRC study has recently been released and Sagan continues to cite it for support. The NAS committee clearly states:

> . . . that unless one or more of the effects lie near the less severe end of their uncertainty ranges, or unless some mitigating effect has been overlooked, there is a clear possibility that great portions of the land area of the northern temperate zone (and, perhaps, a larger segment of the planet) could be severely effected. Possible impacts include major temperature reductions (particularly for an exchange that occurs in the summer) lasting for weeks, with subnormal temperatures persisting for months.

The report also states that:

> . . . the committee cannot subscribe with confidence to any specific quantitative conclusions drawn from calculations based on current scientific knowledge.

And it emphasizes that:

> A more definitive scientific statement can be made only when many of the uncertainties have been narrowed, when the smaller scale phenomena are better understood, and when atmospheric response models have been constructed and have acquired credibility for the parameter ranges of this phenomenology.

I will be forgiven if I also quote a slightly earlier passage in the study:

> Some reviewers of earlier drafts of this report . . . suggested that at present the only scientifically valid conclusion would be that it is not at this time possible to calculate the atmospheric effects of nuclear war.

V

With one or two exceptions, the above remarks are scientific in the broadest sense of the term. They stand or fall on their own merit, independently of who made them. Unfortunately, the nuclear winter debate has not avoided taking on an *ex cathedra* and *ad hominem* character and to this extent it has become unscientific. In a recent rebuttal to *Nature* Editor John Maddox, TTAPS wrote:

> Our findings on what we have called nuclear winter evolved from, and were partly calibrated by, 12 years of related research on Martian dust storms, the climatic consequences of volcanic explosions on Earth and the possible collision of an asteroid or cometary nucleus with the Earth at the time of the Cretaceous/Tertiary extinctions.
>
> Given the importance and sensitivity of the subject, we took extraordinary measures to have our calculations reviewed by a large number of experts in atmospheric physics and chemistry, at a meeting specially convened for this purpose in April 1983, and by other means—well before the submission of the paper for publication. Our article refers to 95 published

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

scientific papers and reports in which further details can be found . . .

We hold . . . that open and informed debate is the only responsible approach, given the gravity of the potential climatic catastrophe we believe we have uncovered . . .

. . . By his statements, Maddox also seems to be unaware that climatic effects of volcanic explosions are caused principally by sulphuric acid aerosols, not by silicate dust.

Any layman or scientist who is not familiar with the details of nuclear winter and who reads the above passage attentively will be perplexed and want to question three points of logic. First, how can a technique be calibrated against an event—the collision of an asteroid with the Earth 65 million years ago—that may not have happened? Second, if the primary effects of volcanic explosions are caused by sulphuric acid aerosols and the nuclear winter effects by soot and dust, then of what relevance is a calibration between volcanos and nuclear winter? These two questions attempt to drag us back to the scientific domain but the third offers a transition into a new realm: of what significance is the fact that 12 years of research were involved and 95 references cited? Absolutely none.

The peer review conference of April, 1983, has now been mentioned several times. It was held in Cambridge, Massachussetts and is described by Ehrlich in his *Amicus* article. I let him tell the story as he saw it:

The notion of setting up an important conference in less than three months was appalling but we all thought the seriousness of the issue made it imperative. Everyone agreed, however, that these meetings should be closed to press and public. Great harm could result if conclusions were reached before they were reviewed thoroughly or if speculations were mistranslated into fact. Raven, one of the busiest biologists in the nation and one of the leaders in the battle to save tropical rain forests, was prevailed upon to accept the task of organizing the meeting. The rest of us promised to help.

Others were like-minded. About seventy of the nation's top scientists were concerned enough to drop everything and converge on Cambridge in April. For two days, the TTAPS results were given intensive scrutiny by some of the toughest possible critics, including Schneider, who specializes in climate modeling; Holdren, whose detailed knowledge of arsenals and arms control qualifies him to evaluate the TTAPS war scenarios; Crutzen and Birks; George Carrier from Harvard, who was then just about to chair a new U.S. National Academy of Sciences Committee on the atmospheric effects of nuclear weapons explosions (the Academy had recognized the inadequacy of its earlier study); Vladimir Aleksandrov of the Laboratory

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of Climate Modeling of the Soviet Union's Academy of Sciences; Jerry Mahlman, an outstanding atmospheric dynamicist from Princeton; and Robert Cess, an expert in radiative transfer from the State University of New York at Stony Brook.

Ehrlich writes in summation:

> TTAPS' basic conclusions went unchallanged, even though everyone present had hoped they would prove too pessimistic. *It appeared that even the explosion of a 100-kiloton warhead over each of a thousand cities (a 100 megaton war) could bring on a nuclear winter—and that would mean the detonation of only about one percent of the combined present American-Soviet arsenals (some 10,000 megatons).* [Ehrlich's italics.]

Ehrlich has correctly stated the number of explosions assumed in the TTAPS city scenario but otherwise his passage is highly misleading. The enthusiasm he marshals was not universally shared.

Robert Cess visited us in Princeton to give a seminar and has provided us with much useful insight into the nuclear winter problem. I wish to thank him now. He tells us simply that he was invited to the conference on the basis of having changed a number in a computer code, gave a talk and left. He participated in no peer review process. Cess did not challenge the TTAPS findings because he was essentially not there. Ehrlich has presumed his silence betokened consent. Since the conference, Cess has written a paper which shows that some of the TTAPS simplifications must result in an overestimate of the cooling. He calls the Ehrlich article "a snow job."

During our work, Jerry Mahlman also gave us frequent advice and participated in our seminars. Of Ehrlich's summary remark he says:

> It is completely *untrue* that the basic conclusions went unchallenged. Points that I can recall were challenged include: Their smoke altitude to 15 kilometers (Carrier and Mahlman) later reduced; one-dimensionality and neglected effects of "spottiness"; heat capacity of the oceans; assumed smoke optical properties; greatly accelerated smoke transport to the Southern Hemisphere; gloom over the tropics; neglect of condensation cap at the top of smoke plumes.

It is fair to say Mahlman finds many of the TTAPS assumptions unjustified and some untenable. It is fair to say he is critical of the entire one-dimensional approach. It is not fair to mute his criticisms and thereby imply he agrees with the TTAPS conclusions. He simply doesn't. "The TTAPS group has a high-side bias," he has said, "and I'd be willing to put money on the table that the final answer is down from their result." Mahlman has also accurately expressed the feeling of many scientists regarding the progress of the nuclear winter debate. "In a rational scientific environment, no one would be bothered by the lack of consensus. This is a five or ten year research program. The difficulty is that we are being forced to

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

converge to a result in six or eight months."

For perhaps similar reasons, Frank von Hippel, who was on the steering committee of the April conference, resigned in protest. "Sagan was not going to allow discussion of other work and I saw that it would be a sideshow."

George Carrier himself is reported in a recent issue of *Nature* to have said that he believed both Sagan and Edward Teller have taken the results of the recent calculations "too literally," and that the current models can at best give "indications" of the climatic change following a nuclear war.

Near the end of the summer, we had Richard Turco visit CEES to report on the latest nuclear winter research. He was very receptive to our criticisms and suggestions. Both he and Tom Ackerman have been equally forthcoming with the details of the TTAPS computer code. The *New York Times* quotes Turco as saying, "Initially there was lots of skepticism. People tried to punch holes in it, but that didn't work." Perhaps he feels that way, but with us he displayed such an appreciation of the uncertainties involved that it was difficult to argue with him. He agrees that two days at a conference is not enough to "get down to the nitty-gritty." He freely acknowledges that Jerry Mahlman "had trouble with the study." Turco and I will continue to have our differences. But I have no quarrel with his remark made to me late in the afternoon: "The potential for ecological disaster is large."

VI

Ehrlich's article, in an obvious sense, has nothing to do with nuclear winter. I have alluded above to the famous exchange at the end of Robert Bolt's play, *A Man For All Seasons*. Thomas More has refused to give his consent to the King's divorce and is brought to trial for high treason. Cromwell, the prosecutor, argues that the silence of a corpse betokens nothing. "This is silence pure and simple." The silence of a tacit witness to a crime betokens complicity. More's silence betokens "not silence at all, but most eloquent denial."

> More: The maxim of the law is: silence gives consent. If, therefore, you wish to construe what my silence "betokened," you must construe that I consented, not that I denied.
>
> Cromwell: Is that what the world in fact construes from it? Do you pretend that is what you *wish* the world to construe from it?
>
> More: The world must construe according to its wits. This court must construe according to the law.

This dialogue applies directly to the nuclear winter debate. The majority of scientists have remained silent or spoken with muted voices. Ehrlich has construed "according to the law" that their silence betokens consent. But Cromwell's question is relevant: what do they wish the world to construe?

My answer is that the silence of the majority betokens the silence of a corpse. Most scientists have simply not looked closely at the nuclear winter calculations and most scientists, by virtue of experience, do not express opinions on theories about which they know nothing.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

This is silence pure and simple. There is a smaller class of scientists, on the other hand, who have thought about nuclear winter and continue to say nothing. These scientists may be likened to Thomas More who, after his conviction, admits that he does oppose the King. .

Neither the silent majority nor the Thomas Mores want their opinions and expertise unwittingly co-opted for any cause. In this regard scientists are like anyone else. But unless they break their silence, their opinion will be construed. According to the law.

Ninety times out of one hundred, Freeman Dyson's first reaction to a statement is, "I disagree." It is a critical response but a creative one, for it allows other possibilities to be explored. Over the last few years, Freeman has taught me much and now I am going to use his own lessons against him; it's the best compliment I can pay him. It happens that he has recently written a lecture entitled *Star Wars, Austrianization and Nuclear Winter*. In his own words:

> When Carl Sagan and his colleagues began two years ago to bring the possibilities of nuclear winter dramatically to the attention of the public, they put professional scientists like me into an awkward position. On the one hand, the professional duty of a scientist confronted with a new and exciting theory is to try to prove it wrong. That is the way science works. That is the way science stays honest . . .
>
> On the other hand, nuclear winter is not just a theory. It is also a political issue with profound moral implications. If people believe that our weapons endanger not only our own existence and the existence of our enemies but also the existence of human societies all over the planet, this belief will have practical consequences. It will lend powerful support to those voices in all countries who oppose nuclear weapons deployments. It will increase the influence of those who consider nuclear weapons to be an abomination and demand radical changes in present policies. So my instincts as a scientist come into sharp conflict with my instincts as a human being. As a scientist I want to rip the theory apart but as a human being I want to believe it. This is one of the rare instances of a genuine conflict between the demands of science and the demands of humanity. As a scientist I judge the nuclear winter theory to be a sloppy piece of work, full of gaps and unjustified assumptions. As a human being I hope fervently that it is right. It is a real and uncomfortable dilemma.

Freeman goes on to say that there are three responses to the dilemma. The first is to say that we are scientists second and human beings first, so we will forget our scientific misgivings and "jump on to the nuclear winter bandwagon." The second response, as scientists dedicated to truth, is to criticize nuclear winter as harshly as we would "any other half-baked theory." The third is to realize it won't do any good in the long run to believe a wrong theory but

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

it will not do any good in the short run to attack it publicly, so let us remain silent until the facts become clear. Freeman has chosen the third response. "It is an unheroic and uncomfortable compromise, but I prefer it to either of the simple alternatives. The dilemma is similar to the dilemmas which occur frequently in personal and family life, when the demands of honesty and friendship pull in opposite directions. It is good to be honest but it is often better to remain silent."

Every scientist who has looked more than casually into nuclear winter shares Freeman's dilemma and feels the same awkwardness. Nonetheless, I disagree with him on two counts and therefore arrive at a different response.

The first count is one of logic. Freeman reads a public lecture at the University of Chicago in which he says, "As a scientist I judge the nuclear winter theory to be a sloppy piece of work, full of gaps and unjustified assumptions." A few sentences later he says, "Let us remain silent until the facts become clear." When I read documents from the Defense Technical Information Center, it is always a mental jolt to stumble across, printed in large, bold letters:

BLANK PAGE

This is a self-referential logical contradiction. Freeman's essay produces much the same effect. The source of the contradiction is not hard to find. It lies precisely in the conflict of interests that Freeman himself discusses. Both his wish to remain silent and his urge to speak out have surfaced in the same lecture. I sympathize with his dilemma more than he probably knows but, as the Russians say, "You can't eat the same pie twice."

My second disagreement with Freeman lies in his interpretation that "nuclear winter is a political issue with profound moral implications." That nuclear winter is a political issue cannot be denied. The question is, does it deserve to be one? It is not clear to me at what point a scientific theory should become the basis of a political issue, but my instincts tell me that the science should be established first, the politics second.

It is equally dangerous to base the moral argument on a tentative scientific result. Surely, to kill one billion innocent people is an act so close to absolute immorality that it should be sufficient to guide our moral debates about nuclear war. The proponents of nuclear winter who conjecture four billion dead and conclude a fourfold increase in immorality strike me as akin to the medieval theologians who counted angels on pins and the perfections of God.

Such philosophical quandaries would be academic if they did not lead to distinct responses. I can illustrate how this happens best by resorting to a personal experience. This story will also help explain why my response to nuclear winter is different from Freeman's.

Not long ago, I had the opportunity to give a number of talks on nuclear winter in Austin, Texas, including a luncheon seminar for a group of astrophysicists. No one quarreled seriously with any of my scientific statements—which again shows the ineffectiveness of peer review—yet more than one told

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

me bluntly that I should keep my doubts to myself. To a man the rest of those present remained silent on this point. I assumed their silence betokened consent—that to voice misgivings in public was irresponsible. I left the seminar with a bad taste in my mouth. There were now two truths, a truth for scientists and a truth for public consumption. They were both based on the same set of facts but otherwise nonintersecting. Later that day, for the first time in my life, I was called a fascist. I raised scientific questions about a theory that left-wing liberals are morally obligated to support, therefore I was a fascist. Although the remark was made partly in jest, I discovered I did not like it. The same day, a very right-wing physicist congratulated me for doing "God's work." This remark was also made partly in jest, was not put as offensively, but made no more sense.

The thought that a scientist cannot criticize a scientific theory on its scientific merits is more than annoying to a scientist. I have to admit that in my case it is very nearly enough to make me quit science altogether. "There is no such thing as a bad electron," Steven Weinberg is supposed to have said. Apparently he was mistaken. It was also Steven Weinberg who bumped into me in the corridor a few days after the seminar and said that he "enjoyed" my remarks. He thought my comments reasonable but asked if I wouldn't lie to prevent a nuclear war. I replied certainly, if I thought I was not going to be found out. "Of course. That's why there is no point lying in this case, because somebody will sooner or later open his mouth." Over the next few days, more and more of the participants in the seminar approached me and acknowledged that they had been horrified at the suggestion that scientific criticism of nuclear winter be stifled. I had misconstrued their silence. Yet silent they had been. Was this the result of a high moral dilemma on their minds? No, lunch hour was over, the discussion had gone on too long and it was time to get back to classes. This silence betokened life by the clock.

In his book *Weapons and Hope*, Freeman follows George Kennan in the search for a concept of weaponry that is robust. "Above all, a concept should be robust; robust enough to survive mistranslations into various languages, to survive distortion by political pressures and interservice rivalries, to survive drowning in floods of emotion engendered by international crises and catastrophes."

I propose that the same criteria should apply to nuclear winter and any issue of similar importance.

To remain silent is not robust because, as Thomas More learned, silence can betoken many things. It can be turned around and be made to speak loudly. Silence is not robust because "the truth will out." This was Steven Weinberg's point and he had been proven correct before the remark was made. During the last six months, the pages of *Nature* have been filled with an acrimonious debate over nuclear winter. TTAPS have had their say, Edward Teller and many others. Now we arrive at the most prosaic silence: the silence

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of fear. Scientists like my Texas friends are afraid to speak out because they do not know how much has been said already. It is too late to remain silent.

The citation of experts in your favor who in fact disagree with you is not robust because someone will notice before long.

Overstatement is not robust. We have all worried about a nuclear winter backfire. Freeman is correct when he notes that for a backfire to occur "it is not necessary that the theory be proved flatly wrong. It could also happen that the theory is proved to be right but rather simple changes in weapon deployments and targeting rules will be sufficient to make the major effects of nuclear winter disappear." He recalls that Pauling's disarmament campaign collapsed when the Limited Test-Ban treaty was signed in 1963. The campaign was directed against the fallout, not the weapons. A simple technical fix—hiding the weapons underground—removed the threat of fallout but not the threat of nuclear war. "The wave of moral outrage that Carl Sagan has created must be directed at the evil of nuclear war itself and not merely against its consequences."

Although Freeman probably does not know it, his concern is fast becoming reality. We have already seen documents that tell us how to avoid nuclear winter. Theodore A. Postol summarizing a paper on "Possible Military and Strategic Implications of Nuclear Winter":

> By pointing to these structural problems in our policy, I have tried to explain why a threat of nuclear winter does not necessarily pose planning problems that are significantly more problematic than those we already have . . .
>
> I believe I have also shown how certain other nuclear effects could be used to construct a nuclear force that can credibly be used to threaten Soviet society with complete destruction, without causing, in all probability, a nuclear winter effect.

Vice-Admiral J.A. Lyons in *Science*: "In the long term, the [results] deserve serious study to see what, if any, changes in U.S. targeting policy are required." Let us see if we can make nuclear winter go away without reducing the size of the arsenals.

Nuclear winter has also been considered a weapon of the most perverse sort. Dr. Richard Wagner, Assistant to the Secretary of Defense for Atomic Energy, as reported by the *New York Times*: "An attacker might be tempted to strike first, right up to the threshold of nuclear winter knowing that 'the prospect of going over the threshold would inhibit the response.' " Such speculations verge on the lunatic. I am gratified to learn that Wagner had been "sitting here all morning wondering whether to introduce the thought."

I hope these examples illustrate that, not only do planners see nuclear winter as vulnerable to a technical fix, but that it is naive to expect the response will be simply the laying-down of arms by the United States and the Soviet Union.

Carl Sagan has recently published a "one-year anniversary" article in *Parade* entitled "We Can Prevent Nuclear

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Winter." He has fallen squarely into Freeman's trap: he focuses entirely on the symptoms and not on the disease. Nuclear war is no longer of sufficient consequence to figure in the title. "Quite apart from the radioactivity," Sagan writes, "the toxic smogs, the later enhancement of ultraviolet light from the sun and other effects, it is clear that if the lights go out and the temperature plunges—for months, if not for years—our global civilization and the human species will be profoundly imperiled." The question, whether there will be a global civilization left to imperil, is not asked. Surely this approach, in the profoundest sense, is not robust.

If Freeman will not agree that honesty is better than silence, perhaps he will agree that it is more robust. It has a long history of being the best policy.

In writing this essay I have endeavored to be precise, accurate, and fair. It seems to me, in the long run, to be the simplest and most robust strategy. I embarked on my chronicle largely to clarify the issues for myself. At the end of my chronicle I find that the issues are not so complex after all.

On the scientific level, the First Commandment has clearly been violated. The First Commandment of science states *Thou Shalt Not Believe Thine Own Theories Too Much* or, more succinctly, *Thou Shalt Not Covet Thine Own Hypotheses*. There is no conflict between advocating a hypothesis, and even championing it, and admitting it might be wrong. There is no credit lost in giving someone else his due.

On the medical level, attention has been diverted from the disease of nuclear war to the symptom of nuclear winter. Fixing the one will not cure the other.

On the publicity level, attempts to ensure robustness have undermined it. For a theory to be correct does not require that every scientist in the world sign his name to it. Reality is, I would like to think, not determined by referendum.

On a human level, more than one scientist has convinced himself there is a conflict between saying in public, "I am morally opposed to nuclear war on the grounds that it constitutes mass murder on an unimaginable scale," and, "I am not convinced of the nuclear winter calculations but they are worth pursuing." I do not believe the issues are so complex that the public cannot understand the difference between these two statements.

When the air finally clears, we will find the climatologists going about their business: they will argue and they will fight and they will attempt to get closer to the truth. They will do this regardless of what has been said in public, and when the public words have been long forgotten, it will be the results which remain. And if the results should fail to predict with certainty a climatic catastrophe, this is not so important. It is not important because the truth about nuclear war is horrible enough not to require distortion. If the horror is not sufficient to prevent the waging of such a war, then we have already lost the ability to comprehend what will follow. If reason has any chance, there is no need to swerve from the simplest course:

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

say what you know with force and conviction, admit what you don't know, and forget the rest. ■

Postscript

I would first like to say that all of the quotations appearing in this article from unpublished sources were approved by the authors personally.

Richard Turco had a number of technical corrections which I have attempted to incorporate into this draft. He may still object to several points. Among his major criticisms was that my entire argument falls apart if the number of outright fatalities in a nuclear exchange is much less than the 600 million lower bound I claimed. Indeed, Pentagon estimates are chronically much lower than this—so low that nobody believes them. I do not subscribe with confidence to any such estimates. My numbers represent an average compiled from various sources. Even Sagan in his Parade article says "more than 2 billion—almost half of all the humans on earth—would be destroyed in the immediate aftermath of a global thermonuclear war." Two billion is enough for me.

Since 1984 much work has been done on nuclear winter and the studies I focused on in the memoir are essentially obsolete. Three-dimensional, interactive calculations have been pursued by MacCracken and Covey, Schneider and Thompson. The effects of oceans, infrared absorption and particle coagulation have been included. All these details tend to mitigate the original TTAPS result.

At our first meeting with Soviet scientists in December 1983, Barbara Levi and I used the now-popular term "nuclear fall" to describe the possible outcome of more refined calculations. Aleksandrov and the Vice-President of the Soviet Academy of Sciences, E. Velikov, objected strenuously. However, in the summer 1986 issue of Foreign Affairs, *Thompson and Schneider write, ". . . on scientific grounds the global apocalyptic conclusions of the initial nuclear winter hypothesis can now be relegated to a vanishingly low level of probability."*

This strikes me as a miniature example of the backfire I discussed in the memoir. The results presented by Thompson and Schneider still show temperature drops over land of about 10° for a period of days to weeks. Had the initial predictions not been so dramatic, this might still be considered a major disaster.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Elizabeth Moon

JUST ANOTHER DAY AT THE WEATHER SERVICE

Some jobs have to be done—and need just the right person doing them!

I caught the phone on the second ring. "National Weather Service," I said. "UFO Clearinghouse, George Karantzopoulin speaking."

"I'm sorry to bother you," said the voice in my ear. Male, middle-aged, and embarrassed. "This is Professor Garris, of the science department at Owen Junior College . . ."

"Yes, sir," I said. "What can we do for you, Professor?"

"Well." He cleared his throat. "I'm sure it's just a weather balloon, or something . . . " That trailed away, then he spoke with more confidence. "You know, you people sent me a schedule at the beginning of the year, so that I wouldn't have students calling you up for no reason . . . "

"Yes?"

"But—well—the schedule didn't mention last night. Three students—and I saw it myself . . . I'm sure it wasn't anything . . . you know . . . but still, if I don't check, they'll say I'm narrow-minded, and . . . "

"You're saying you saw an unidentified flying object?" I hardly waited for his answer. "What time, sir, and where were you, and what was its course?"

With a total of eight "institutions of higher learning"—universities, colleges, and junior colleges—within fifty miles, it's a rare week that we don't get a UFO call. And a rare semester when some enterprising youth doesn't build a UFO and send it up just to see what his or her peers will say. That's why I have an extension of the National Weather Service number. I'm supposed to prevent panic and national network news coverage of an innocent weather balloon or research rocket launch. I have a form to fill out, for every "sighting," which asks for more details than most callers have even thought of. It's wonderful what large computers can do in storing all those data, and routing all UFO calls right to my desk, from all over the country.

Professor Garris could answer all the questions; he was an amateur astronomer who'd been star-gazing with the Space Club of the college. He gave it to me in great detail: the apparent size, the exact location of the observers, the azimuth and bearing, and the course the thing appeared to take. I went "mmm" at intervals, to assure him I was listening. Then he said, "Of course, I know it wasn't a—well, anything odd—that

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

is . . . you know . . . ''

''From outer space?'' I asked, making a joke of it. His chuckle in response was feeble. ''Just a second,'' I went on. ''I'll check the master file. Sometimes, you know, someone has a permit to send up a research balloon, and they don't bother to tell us . . . they're supposed to, but . . . ''

''I understand,'' he said eagerly. He wanted me to know he was sane, plain, and sound. He was also scared stiff, and sounded it. I rambled on.

''Yeah—if we complain, it could cost them a grant—it's nearly always a government grant—but unless a citizen is really riled, we—''

''You mean do I want . . . ? Oh, no, Mr. Uh—''

''Call me George,'' I said. ''No one but my family can pronounce the other.'' And that was true enough, even in the Anglicized version. George is a good name. John or Jim is almost too all-American. George is the kind of name that no one would pick, and yet it's not peculiar.

''George,'' he agreed. ''I'm not filing a complaint, you understand. If it's someone's research—''

''They're supposed to file a flight plan with us. Just to keep people from worrying.''

''Yeah, but—''

''Oh.'' I let my voice express finding something. ''Here it is. Sorry—they did file. It's a university out west, Professor Garris. Research on high-altitude gas exchange and something about wheat. Wonder how that works. Anyway, it was launched yesterday, and just let me check the wind drift . . . yes. It sure could have been visible when you saw it. I'm sorry, sir. Someone should have sent you an updated schedule.''

''That's fine,'' he said. ''That's just what I told them—just what it had to be. It's only—you know, you get to depending on the schedules, and then when something comes up different . . . ''

''Yeah,'' I said. ''I understand. We're always glad to chase these things down, Professor. Don't hesitate to call.''

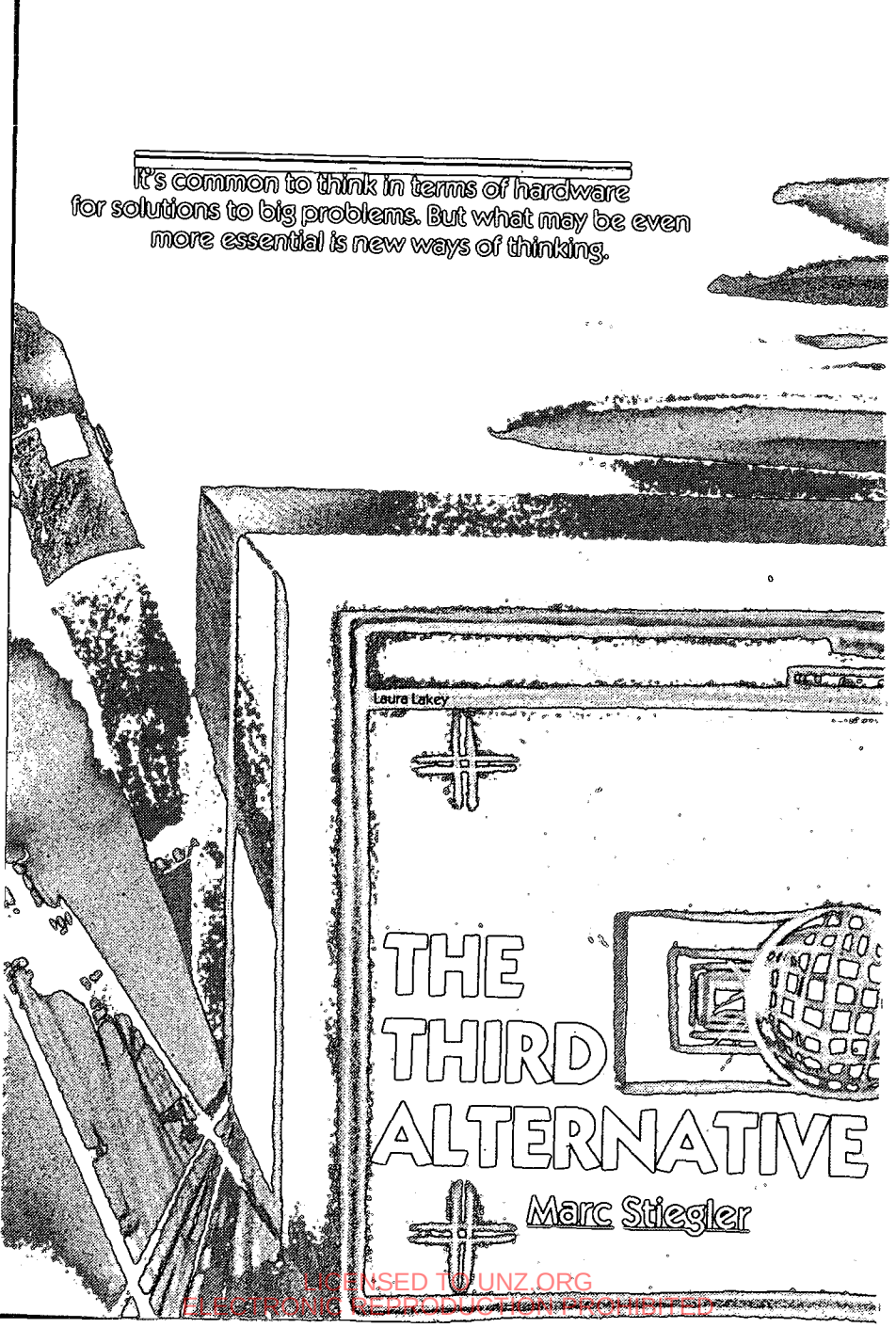
''Thanks,'' he said. ''I really—I was afraid you'd think I was some crank or something.''

''Oh, no,'' I said, ''we aren't like that.'' And he thanked me again and hung up, obviously relieved.

So was I. The last thing our space program needed was another outbreak of the sort of hysteria I'd seen in the '70s. Half the population out at night, looking for odd lights, and that sort of thing. Fear of aliens, fear of space itself. I leaned back in my chair, promising my transfer crew a real scolding when they returned. They know they're supposed to stick to the schedule, or update it. All it takes to mess up our whole program is some halfway intelligent and articulate observer—a professor would be the worst—spotting a ''weather balloon'' off the schedule. Of course, it *was* a weather-balloon all right—but not theirs, any more than I work for the National Weather Service. It's really wonderful what those big computers can do, routing all those UFO calls right to my desk, and storing all the reports I file. ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

It's common to think in terms of hardware for solutions to big problems. But what may be even more essential is new ways of thinking.

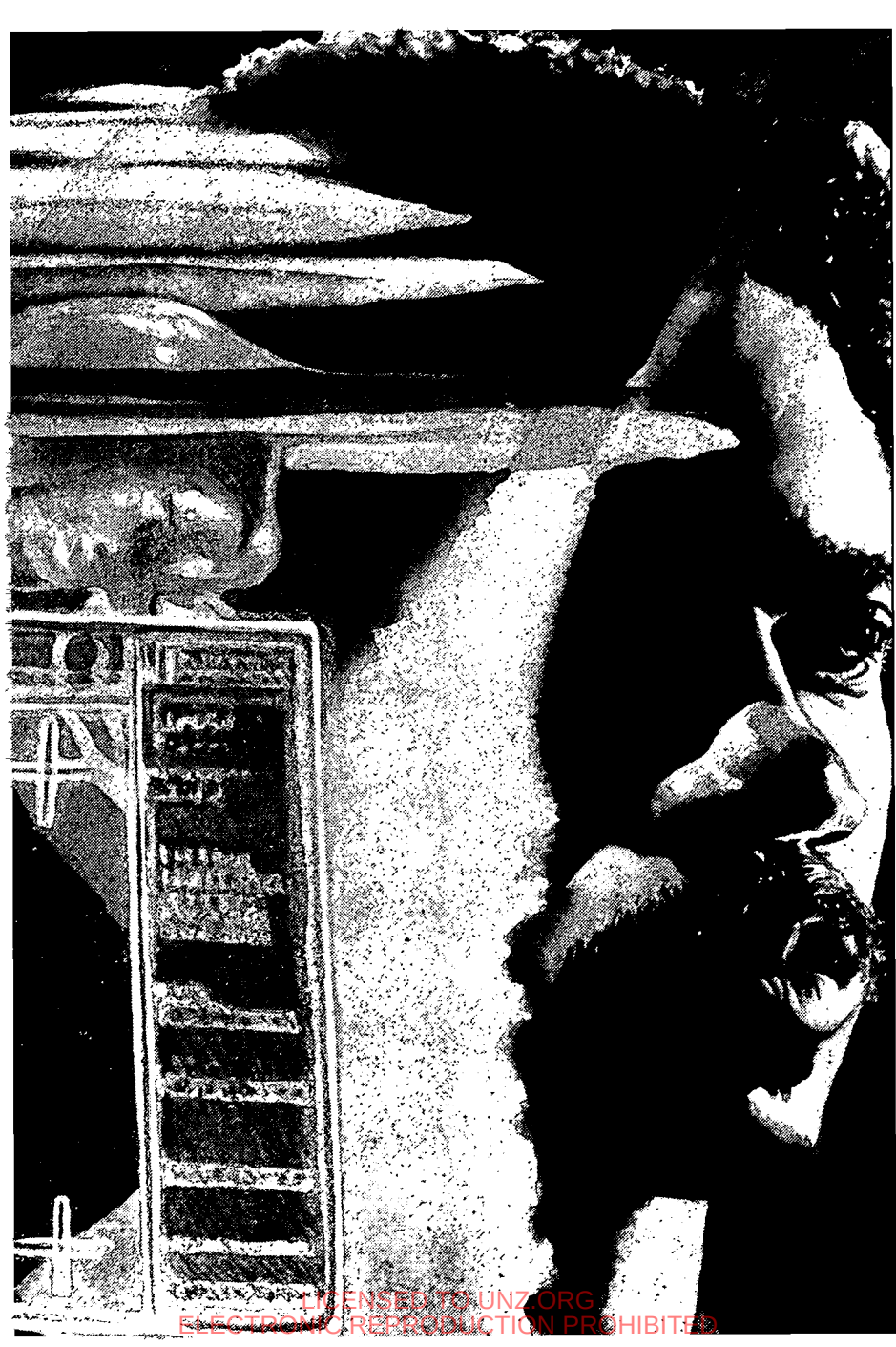


Laura Lakey

THE THIRD ALTERNATIVE

Marc Stiegler

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED.

We mark the beginning of the Information Age with the implementation of the Forstil Doctrine. Many aspects of an Information Age existed before that time. But in the implementation of the Forstil Doctrine, the Information Age asserted its ascendancy. Through this Doctrine, mankind learned not that knowledge is power, but that knowledge wisely used can be superior to power.

Of course, we do not demark the Information Age with President Forstil's announcement of the Doctrine itself, but with the Night that followed.

—The Zetetic Institute: Early Years

Snap. Bill's hands were shaking. He slid them beneath the table, to prevent the audience from seeing his weakness. He was presenting the most terrifying double-feature story in the history of journalism—a story so terrifying that he wondered whether he should put it on the air, even though it would make his career. For mankind's sake, he knew that he had to avoid creating any misperceptions in the minds of his viewers. His safest short-term action would have been to say nothing, thus creating no misperceptions at all. Yet for mankind's sake, he had to spread the information he had gathered, creating correct understandings. The only long-term safety lay in communicating the correct perceptions.

Bill dug his fingers into his thighs, and continued to tremble. He knew that he would fail.

Click. "Good evening, ladies and gentlemen," he told the camera that represented over 50 million viewers, "For those of you who have not heard, an assassination attempt has been made on President Carson. Tonight we have exclusive film showing the assassin in the act; we also have an exclusive story on a possible Soviet link to the assassination attempt."

Cut. The recording of events earlier that day unfolded. A striking woman in royal blue moved gracefully across the front of a crowded room to the podium. Her silk scarf fluttered ever so slightly with the speed of her motion. The room, noisy before, now broke into cheers and clapping. She turned; the audience could now see that she was President Nell Carson, here to announce the new vice-president.

Bill felt dizzy again, thinking back across the events that had led Nell Carson to this podium. A few weeks ago, Nell had been the vice-president herself. Then Jim Mayfield had been president, a weak man with a weak heart. When the Soviets had invaded West Germany and overrun Denmark, Mayfield had collapsed. He had died in Nell's arms, leaving her with a nation in panic and an army already torn to tatters by the massive, brutal force of the Soviet onslaught.

Fortunately Nell had not joined the panic. Instead she had focused a last-ditch effort to save Europe on the Sling system, a research and development project under the leadership of Nathan Pilstrom, Founder of the Zetetic Institute. With the help of the Sling Hunters, the tattered NATO forces had stopped the Soviet army, and had eventually pressed it back to East Germany. The war had ended with a whimper, not a bang—a Flameout, as the news media now described it.

Bill's attention returned to the video-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

tape of Nell's speech. Her voice rose and fell, pausing sometimes, rushing at others. She spoke of the difficulty of making the vice-presidential selection, and the marvelous qualities of the man she had finally chosen. Her eyes shone, her voice sang, but not even Nell Carson could make this standard speech come to life. "—That's why I'm pleased to announce the new vice-president, Hilan Forstil!" The room had filled with applause. Senator Forstil was the man who had introduced Nell Carson to Nathan Pilstrom and the Sling. He was an excellent choice for the new vice-president.

Pan. The camerman, impatient with the ceremony, let his camera drift across the audience. He focused on a stocky man, a man who might once have had glowing health, but who now had tight twists of tension across his face and a gaunt look as if he had not slept for days. The man reached into the shadow of his pocket to retrieve a darker shadow.

Zoom. The darker shadow now held in the man's pale hand came into sharp focus. It had the shape of a pistol.

Click. Flash. Cut. The man fired twice. President Carson jerked across the stage. A dozen men moved rapidly, identifying themselves by their speed and organization as Secret Service Agents.

Flash. The gaunt man turned his pistol sideways. Looking peaceful at last, he fired once more, striking himself in the temple.

Cut. The tape ended. The television view returned to focus on Bill himself.

Bill stumbled, feeling the shock of the day's events again. But he recovered quickly and told the audience all that was known about Ted Muhlman, the assassin; though Bill spoke at length, the sum of his words was, *we know nothing about this man.*

"Why did Ted shoot the president? We don't know. But the most terrifying suggestions come from our sources outside the United States." Bill held up the document he had received less than a day earlier, from one of his contacts in the Soviet Union. In bold red letters the English translation of the title slashed diagonally across the cover: *A Revised Assessment Of The Global Consequences Of Nuclear War.*

"What does this document have to do with the attack on President Carson?" Bill riffled the pages, stopping on the final chapter, the Summary. "When this document first came out it contained a very analytical summary, written by the analysts who conducted the study. It reflected on the logical consequences of nuclear war." Bill took a deep breath, a shaky pause. "However, that summary angered an important member of the Politburo, so it was rewritten to reflect the thinking of that man. The man who authorized this study—the man who presumably had the summary rewritten—was Yurii Klimov, the new Soviet General Secretary."

Bill cleared his throat. With the somber tone of a judge, he read from the Soviet report. " 'As this revised analysis shows, the global consequences of nuclear war remain grave even under the most optimistic assumptions. However, this danger need not deprive the Soviet Union of opportunities to exercise its strength. Indeed, this unassailable vindication of the dangers of war

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

can work to our advantage. We can count on the threat of global disaster to paralyze enemies, particularly enemies who already show indecisiveness. Chief among these indecisive opponents is the American President Jim Mayfield. Mayfield demonstrates the archetypical set of traits we would desire to see in an American leader.

" 'With Mayfield in office, we can apply force with minimal restraint. Some graduation in scale is still necessary; but we see no reason not to use troops in Iran to resolve the religious tensions there. If Mayfield responds weakly to our invasion of Iran, we may then calm the chronic East German uprisings with an invasion of West Germany. Thus we would continue the successful strategy we initiated in Afghanistan decades ago.' "

Bill looked up at the camera. "Either by coincidence or by intent, this summary describes the Soviet Union's activities for the last year. Now listen to what the summary says about Nell Carson."

He returned to his somber recitation. " 'Of course, we must match our steps to the mood of the American president. If Nell Carson were to succeed President Mayfield, for example, we would have to move with greater caution due to her unpredictability.' " Bill licked his lips. " 'Other potential American leaders can be categorized easily into these two types: the indecisive and the unpredictable. We have composed such a list of American leaders here to encourage further discussion of the timing and intensity of our future geopolitical moves.' "

Bill blinked slowly for the camera. His tone changed; he was done reading. He waved his hands in an impatient gesture, and synopsized. "The 'unpredictable' men and women include both Nell Carson and Hilan Forstil. And the 'indecisive' list includes both Jim Mayfield and the Speaker of the House, Avery Faulke. Ladies and gentlemen, until the selection of Hilan Forstil as our new vice-president this afternoon, Avery Faulke was the next man in line for the presidency."

Bill leaned forward. "The men who wrote this summary believed that they could manipulate Faulke, but that they could not manipulate either President Carson or our new Acting President, Hilan Forstil. Did the Soviet Union instigate this attack on our president, in the hopes of putting Faulke into power before the selection of a new vice-president? It would be very dangerous for us to disregard the possibility if it were true. But it would be equally dangerous for us to believe it, if it were false."

Jet turbines hummed with their fiery power just beyond the confines of the curved metal walls of Nathan's prison. Recycled air from the nozzle overhead blew dry and cold across his face, stealing the moisture from his throat and his eyes. He swallowed a little wetness, while his mind fell into itself. He angrily pondered the current absurdity. He sat in an airplane, performing lazy circles at 30,000 feet, while Nell lay unconscious in Walter Reed hospital.

He blinked in the face of the air nozzle, then twisted out of its way. He joined Hilan in watching Bill Hardie on one of the monitors, moaning softly as Hardie built an array of evidence that

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the Soviet Union had ordered Nell's murder.

"That idiot!" Hilan muttered at the close of the broadcast. "What's he trying to do, start another war?" The engine hum quietly emphasized the danger; they were sailing somewhere over the middle of the United States, in case the assassination was the first step in some grander plan. Nathan focused on Hilan again, forcing himself to think of Hilan in his new role: Acting President Forstil.

Nathan shook his head. "You can tell he's trying to make a Zetetic presentation, though he still has a lot to learn. Unfortunately, it doesn't make any difference—even if Hardie were a perfect Zetetic commentator, he's speaking to a non-Zetetic audience. Both the speaker and the listener must know how to play their parts, or the communication will fail. By the end of this broadcast, half the people in the country will think it was all a Communist plot."

Hilan shook his head. "And the worst part of it is that they may be right."

Nathan started to object, but Hilan continued. "Ted Muhlman was a Communist party member for several years, though he left over a decade ago. In the past couple of years, he's been in and out of mental institutions, suffering from grandiose fantasies. Was he Communist or was he crazy? Or perhaps a little of both—did the KGB whisper in his ear, egging him on? And that ceramic pistol he slipped through the metal detectors—you can't pick one of those up from a Sears catalog. How did Ted Muhlman get one?" Hilan closed his eyes. "And if the Russians really did pull this stunt, what do we do about it? Put out a contract on Klimov?"

Nathan shook his head sharply. "No! He might push the nuclear button if we did that."

Hilan threw his hands in the air helplessly. "So we just do nothing." He threw his head back into the high airplane seat. "It just doesn't pay to be a superpower."

Nathan rolled his eyes. All he could think of was Nell, all he wanted to know was that she would be all right. But these thoughts had nothing to do with the crisis they now faced. "We must keep a clear perspective on what has happened here." He started ticking off the key points. "First of all, we'll probably never know if the Soviets ordered it or not." *Nell!* his thoughts screamed, *if they did this, I want to kill them.* "Second, it doesn't make any difference whether they were behind the attack or not. There's a more frightening, more basic problem here: if that *Revised Assessment Of Nuclear War* really reflects Soviet policy, the Russians are willing to risk nuclear war any time an "indecisive" person occupies the White House." *Thank God, Nell, that you were there, that you were strong! Will you ever be there again? Will you ever be strong again?* "Hilan—President Forstil—for every Nell Carson in U.S. politics there is also a Jim Mayfield. For every Hilan Forstil, there is an Avery Faulke. If that Soviet Doctrine remains in force when another man like Mayfield becomes president, we'll go through this nightmare again. There will be more Irans, more Afghanistans, more—"

"No!" Hilan trembled. "There has to be another alternative."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Nathan asked, "Is that report real?"

Hilan exhaled slowly. "As nearly as the CIA can tell. The Soviet government apparently created that doctrine." He smiled. "Of course, as I'm sure you'd point out, just because a government bureaucracy creates a document doesn't mean that particular individuals know about it. Nor does it mean that particular individuals agree with it, nor that they would necessarily follow it." He quoted the Zetetic commentary, "*Institutions* do not *know* anything; only individuals have knowledge." He shrugged. "Unfortunately, that Summary predicted events perfectly. And it *was* commissioned by Yurii Klimov himself, shortly after he entered the Politburo. It may not be Soviet doctrine, but it's probably Klimov's doctrine." Hilan grimaced like a trapped animal. "Jesus, he's younger than Gorbachev was when he came to power. Klimov could be in charge for decades." He pounded the arm of his chair with his fist. "And there's nothing we can do about it. There's no way to protect ourselves from Klimov except to elect an unbroken succession of strong presidents. And we'll certainly fail on that score."

The plane bounced as it hit an air pocket. They climbed, then leveled off. Nathan felt his throat growing even drier, knowing what he would now offer. "We do have another alternative. I know another choice, an Information Age choice, that is so dangerous, so frightening," he paused, lost for words, and finally smiled, "so *incredible*, that it scares even me."

Hilan looked at him questioningly.

"We know that the HighHunter is a flexible yet reliable weapon." Nathan remembered the first HighHunter barrage, descending upon the Soviet Third Shock Army. Each HighHunter was a simple metal canister, boosted into orbit by rocket, filled with long, thin shafts of steel. Each shaft of steel, or Crowbar, had a sensor on the tip, a fin on the tail, and a computer in the core. When the HighHunter popped open, the Crowbars fell to earth, seeking enemy tanks which they could hit and destroy.

The HighHunter and its Crowbars were more effective than tactical nuclear missiles: a single HighHunter could kill more tanks than a nuke. Even more important than the Hunter's effectiveness, however, was its lack of side effects—no HighHunter had ever killed a civilian or harmed a child. The Sling Project's HighHunter, SkyHunter, and Hopper-Hunter had rendered tactical nuclear weapons obsolete.

Nathan continued, "We built those first HighHunters with small Crowbars for killing tanks. Next we built them with larger Crowbars for killing ships. Now we can build a bigger one, a specially designed one, that kills hardened missile silos."

Hilan continued to stare.

"All the Russian submarines were wiped out in the war. The bomber fields are soft targets, easy to destroy. The mobile missiles on railroad cars have been tracked with near-perfection for years. Only the missiles in hardened silos are invulnerable to existing weapons—and we can destroy *those* with a new Crowbar, a SiloHunter. In principle, we can kill every Russian missile capable of reaching the United States. We can disarm them as a nuclear power."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"A preemptive first strike?"

Nathan nodded. "A *nonnuclear* preemptive first strike. No exploding warheads. There might not be any human casualties at all."

"But if something goes wrong, if they still have a few missiles afterwards, if Klimov decides to shoot them rather than lose them, we could end up with a whole planet covered with casualties."

"Yes."

The hum of engines tightened around the silence as two frightened men stared at one another. Nathan spoke. "I wasn't necessarily recommending this as a course of action. I was pointing it out as an alternative—an alternative that we won't have for long. The Russians are already studying the HighHunters, and the significance of the Flameout. They'll figure out the dangers of a SiloHunter. And there're a number of ways they can protect their silos, once they're alerted."

Hilan laughed, the laughter of a man on the verge of tears. "It certainly puts all our eggs in one basket, doesn't it?" He continued softly. "But the alternative, to pray that we never have a president like Mayfield again, is like putting all our eggs into a trash masher. Jesus, what an awful choice." He held his head in his hands. And then Hilan Forstil, a man who had made his life a demonstration of power and confidence, moaned like a small child. "I don't know. I don't know." He reached in his pocket and pulled out a small Swiss Army knife. He played with it as he spoke, more to himself than to Nathan. "You know, ever since I made that trip up the mountain with your sister Jan, I've been different. I almost died there. It changed my perspective. Now, whenever I face a crisis so difficult that I can't imagine how to cope with it, I remember that *I am a man who has climbed a MOUNTAIN*. What obstacle can challenge a man who can do such things?" He breathed deeply, and once again he was the president.

The airplane started a gentle descent. An aide appeared at Hilan's side. "Mr. President, there have been no followups to the assassination. With your permission, we'll return to base."

Hilan nodded. "Excellent." He smiled at Nathan. "I presume you're off to see how Nell's doing."

Nathan smiled back, despite his surprise; had his thoughts of Nell been that obvious? "Of course. I just hope they let me in; I'm not exactly family or anything."

"They'll let you in. You'll go as my envoy."

Nathan nodded his thanks. "I have something for you as well." He fumbled for a pen and paper, wrote down a telephone number and a password. "There's going to be a decision duel tonight, an important one. One of our best students is dueling for his certification. *Join it.*" He stressed the words.

Reluctantly, Hilan nodded. "I presume there's a reason for this?"

"Of course." Nathan smiled mischievously. "Isn't there always?"

Jessie Webler looked at the dueling screen with both pleasure and disappointment. He sat in the left-hand duelist's chair, like a chess master preparing for the world championship, suspicious that his opponent was leaving him alone

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

during this quiet pregame time specifically to increase his anxiety.

Such a chess-playing opponent would have smiled, for the psychological impact of the waiting was taking its toll. Jessie played with the computer's trackball for a moment with rapid, exacting movements. Next he sat quite still, relaxed and unfocused. Finally, he sat as though staring into a dark shadow where monsters dwelled, while he pulled at his moustache in short jerks; his moustache had several bare patches as a consequence, exposing the chocolate-brown skin beneath.

As he shifted between relaxation, playful rolling of the trackball, and anxious tugging at his upper lip, Jessie recognized the swirl of emotions rolling within him. Sometimes, he confessed to himself, he felt the silly yet dangerous anxiety of a student taking his final exam. Jessie found this anxiety unacceptable, though understandable: it *was* his final exam. He was about to begin his certification duel. The statement he defended hung upon the main screen, immutable and self-evident: NO SITUATION CAN JUSTIFY A PREEMPTIVE FIRST STRIKE AGAINST THE SOVIET UNION.

Pleasure, disappointment, and anxiety. His pleasure came from his confidence that he would win this duel. His disappointment came from his confidence that it would be an easy victory. His anxiety came from a suspicion that perhaps his immutable statement was too obvious. Perhaps the answer was so obvious as to be wrong.

The pleasure and the disappointment seemed like natural echoes of Jessie's whole life. Throughout school he had been top in his class, always enjoying his successes, yet always a little saddened by how easily they came to him. Some people accused him of arrogance, though he didn't feel arrogant inside. Other people accused him of brilliance, though he didn't feel brilliant, either. Indeed, he worried about people's definition of brilliance. Jessie made mistakes all the time. If he himself qualified as a brilliant man, despite his regular failures, what of the others? If a fellow who made mistakes as frequently as Jessie did could qualify as the cream of the human crop, did mankind really have enough smarts to survive? Pondering this question, the anxiety seemed natural to Jessie as well.

When he had first encountered the Zetetic Institute, the concept of the decision duel had staggered him with its elegance. Jessie had quickly recognized it as a belated but correct response to human gullibility, derived from research in the '60s and the '70s. In those long-ago experiments, psychologists had uncovered several critical facts. No one had acknowledged those facts at the time, though the facts seemed obvious now.

The researchers had studied jurors in court trials. One group of jurors attended the trial in the usual way: they sat in the courtroom, watching the defendants and the accusers and the lawyers and the judge. They watched the whites and the blacks and the men and the women, with blond hair and black hair and blue eyes and brown, wearing pinstripe suits and T-shirts, supported by lawyers both flashy and quiet. The psychologists discovered that the jurors made incorrect judgements with disturbing frequency.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

So the second group of jurors did not see the trial: they heard of it. They heard the voices of the defendants and the accusers and the lawyers and the judges. They heard the southern accents and the Boston accents and the ghetto accents. They still made errors, but they made fewer errors.

So the third group of jurors did not even hear the trial: they read it. They read the transcripts of defendants and accusers and lawyers and the judge. Even dull, dry transcripts did not erase all distinguishing marks from the men and women in the courtroom: the college grads and the high school dropouts *still* used different words and different expressions. And the jurors still made errors. But they made fewer errors than either of the other two groups.

When Jessie first heard about those dusty experiments and their obvious results, he wondered why America had not responded with a prompt and efficient transformation of the court system. Surely decisions on human imprisonment were important enough to demand the most accurate possible decision-making processes!

But the court system had not changed, not even over decades of intervening time. Indeed, the results of those studies had quietly disappeared into history, remembered by almost no one. It was through this quiet human forgetfulness that Jessie encountered another of the most frightening features of the human psyche: men tend to remember facts that support the beliefs they already hold. They forget facts that contradict those beliefs.

Zetetic training recognized this flaw of human memory, and fought to overcome it. The battle between training and instinct continued unrelentingly; the progress came slowly, with pain.

The rules of science had uplifted human behavior when studying repeatable, logical problems. Similarly, the rules of the decision duel had uplifted human behavior when faced with passion-filled problems. In the decision duel, only the words on the screen counted, not the race or creed of the duelist. And no disturbing fact, no tiny but fatal flaw in an argument, could be forgotten: the arrows linking the argument to the counterargument were as immutable as the quantifiable facts supporting both positions.

Motion caught his eye. He looked up, and Brad Foster leered at him.

Jessie blinked, and Brad's leer softened into a smile, though Brad's expression did not change; only Jessie's interpretation of the smile had altered. Brad had received his certification just a few months ago, yet he was already famous. He had lost only one duel in school, when he himself had supplied his opposing partner with the critical insight that made Brad's whole argument collapse in smoke and dust. Since certification, Brad had established a reputation dueling in major corporate reorganizations, though insufficient time had passed to assess the accuracy of his analyses. Brad was the latest in the line of star duelists that included Kip Hendrix, Will Barloh, and Nathan Pilstrom.

Brad saluted him. "May accuracy triumph over victory." He spoke the duelist's oath in a monotone perfectly without emotion—that monotone expressed, in its perfect intensity, the depth of Brad's commitment. The oath

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

represented a stunning overthrow of human instinct for those who could obey it: it represented realization that winning a debate was not half so important as ending it with the right answer.

Jessie's throat seemed suddenly dry; he nodded his agreement.

The workstation beeped softly; Jessie jumped at the sound. It marked the beginning of the duel. Jessie adjusted his earphone: at any time a member of the audience could suggest to him, or to Brad, a line of analysis or a counterpoint for presentation on the screen.

The demands of the duel moved to the forefront of Jessie's thoughts. He outlined all the obvious disadvantages to making a first strike on the Soviet Union. First of all, it could end all human life, particularly if the Soviets got wind of the attack and launched their missiles before ours landed.

Regardless of whether the Soviets are able to shoot back or not, the resulting global affects would damage the United States as well, even with a relatively tame "surgical" preemption. What could possibly justify such a risk?

Jessie glanced at Brad again. Brad was brilliant, no doubt about it. Jessie could see it in the way Brad immersed himself in his screen, his total concentration, a pale scholar with a thatch of kinky black hair that only emphasized his ghostly complexion. Jessie felt like he was wrestling with a wraith; he might find himself grabbing the words of his opponent again and again, yet coming away each time empty-handed.

Brad tossed a standard scenario up on the main screen: what if we knew beforehand that the Soviet Union was about to make a first strike against us? Would it not then make sense to try to prevent such an attack with an attack of our own?

Jessie rattled off a list of problems with this supposition, ending with a summary: no matter how many subtle indicators flared up, we couldn't *know* a Soviet attack would occur until the attack was underway. By then it would be too late for us to make a strike that got their missiles before firing.

And shooting without that absolute certainty still entailed all the basic risks. Even if our attack succeeded, America would face the radiation and climatic consequences; again, the risks in acting prematurely overwhelmed the risks in not acting at all. Jessie noted that this logic had surely been followed by both the American president and the Soviet general secretary during the Flameout, and both leaders had come to Jessie's conclusion. Jessie winced as Brad circled this statement in red with a polite explanation: it made no difference what decisions others had made on the matter, or how many people had shared a consensus. The question was whether or not they were *right*.

Despite this gaffe, Jessie's main points remained unassailable. His opposing partner continued to delineate scenes and hypotheses, but all were easily countered. Once Brad caught Jessie off guard: what if the Soviet Union started assassinating our leaders?

Jessie felt unexpected anger, not at Brad, but at the world at large. Nell Carson was still in the hospital; she had not yet recovered consciousness. How could an assassination attempt like that happen? What if the Russians really *had* tried to kill her? Colored with anger, an

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

attack on the Soviet Union *did* seem justified.

But he could not write upon the main screen in the color of anger; when translated to the screen, the color anger seemed tinted with the color of foolishness. He responded that a counterassassination might be a reasonable response; but even under this provocation, they could not justify risking the whole world. No one man or woman could be worth avenging at the cost of a planet.

Brad seemed stalled, as Jessie had expected. Jessie watched Brad frown at his terminal, disturbed by his inability to budge the verdict now growing on the main screen.

The warm joy of victory washed over Jessie. He rejected it; he remembered, even now, that the real victory was not in winning, but in the finding of the right answer. He concentrated on the hard clack of the keys, the rubber grip of the trackball.

Brad smiled. He held his hand to his earphone and studied a corner of his screen. It looked as though he were receiving a stunning idea from one of the members of the audience. That someone could be right there, one of the clutch of viewers in the dueling chamber, or the person could be a continent away, watching the duel on a remote screen.

What novel suggestion could Brad be receiving?

Brad sat quietly for several seconds, his eyes focused on infinity. Suddenly his fingers moved, the only part of his body not held bound by his concentration. Words formed on the screen. Jessie gasped as he read them.

Suppose the preemptive strike did not use nuclear weapons? Suppose that, in addition to having reasonable certainty that the Soviets would one day make a preemptive first strike of their own, America also had a nonnuclear system with which to try a preemption of that Soviet preemption?

A nonnuclear preemptive strike—what a concept! It triggered Jessie to reflect on the questions of nuclear standoff more deeply, more clearly than ever before. His mind raced with ideas that had swirled in his subconscious ever since learning the topic of his certification duel, but which had never surfaced. One particular thoughtstream rose above the rest, to take flight. For the first time, he consciously considered the problem of nuclear war from the point of view of game theory. As his thoughts became clear, he started typing, but he did not type new points or counterpoints into the window defending his position. His understanding was on a larger scale; he requested space in the neutral moderator's part of the screen. The gray bar down the middle of the screen split, and the area of third alternatives, the area of new ideas, opened wide.

The strategic nuclear problem was similar to the Prisoner's Dilemma, he realized. In the classic Dilemma, two prisoners who have committed a crime were placed in separate cells and urged to confess. If neither prisoner betrayed the other, they both went free. But if one betrayed his partner when the other did not, the one who did not betray received a long jail sentence. In the early '80s, logicians had shown that a strictly rational person had to betray his partner if placed in this situation. The Dilemma could only be won by the prisoners if

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

both prisoners were *superrational*, and if each prisoner *knew* that his partner was superrational as well.

Now Jessie viewed the world strategic balance through the prisoner's eyes. If the other prisoner chose to betray you by firing his missiles, he went through the purgatory of fallout and climate changes while you went through the hell of an inferno. If both prisoners chose betrayal, you still went through hell, though at least you had the vindictive pride of thinking you got them back since they went through hell too.

This two prisoner game was simpler than the global nuclear problem, but it was a good place to start. In such a game, the best outcome occurred if:

1) both prisoners believed in the other's honesty, and

2) if both played honestly, by never firing their missiles.

Given this mutual honesty the next step was obvious: dismantle all the missiles. After all, neither prisoner would ever fire his missiles anyway.

But mutual honesty only worked if both parties were superrational. If either party was merely rational, the correct answer, even for the superrational player, was betrayal. Betrayal, in this variant of the Dilemma, meant an immediate, preemptive first strike, before the opposing partner made his *own* preemptive first strike.

What was wrong with this analysis? Jessie looked at his conclusion in horror. Neither America nor the Soviet Union was superrational; the right answer, then was to attack! Something had to be wrong with this analysis.

Something *was* wrong. The analogy to the Prisoner's Dilemma was not perfect. The participants in the global nuclear game had a chance to make a second, followup decision: if the preemptive first strike was not completely successful, the betrayed party could betray his opposing partner later, after assessing the betrayal. Only this risk of delayed betrayal kept the merely rational players away from holocaust.

Jessie had been typing his ideas as they came to him. Brad, reading Jessie's digression, also waxed philosophical, typing more fresh thoughts in the opening for third alternatives. How ironic that two superpowers should look, from the game theory viewpoint, so much like prisoners! They were prisoners, of course, of their own weapons. The nuclear weapon itself, and the hysteria surrounding it, were the guards of the prison that held America and Russia captive. Every day these captors made men face the questions, *Today, will they strike us today? Today, must we strike them today?*

What was the purpose of the thousands of nuclear warheads in American and Soviet arsenals? Even an irrational person could understand that a hundred such warheads could destroy a national civilization. The only reason for having thousands was the danger that the opponent might try to use his warheads to destroy *your* warheads. America needed thousands because the Soviets had thousands; the Soviets needed thousands because the Americans had thousands. If each side had just a hundred apiece, the weapons would achieve the same threatening purpose, as long as the warheads were protected well enough so that the enemy couldn't destroy them.

Jessie observed that if the Soviets

LICENSED TO UNLESS
ELECTRONIC REPRODUCTION PROHIBITED

were superrational, if we *knew* that the Soviets were superrational, then we could initiate a slow unilateral disarmament. The superrational Soviets would follow with their own disarmament, recognizing that they no longer needed the extra missiles, realizing that the superrational Americans would not continue the disarmament unless the Soviets also disarmed and returned to sanity. They could both disarm down to the point where global catastrophe was no longer possible. They would not disarm entirely, since there were other nuclear contestants in the world, controlled by other non-superrational groups. But everyone would breathe more easily.

Brad drove back to the main point, however: if the Soviets were merely rational, if we had strong reason to fear a preemptive strike from them, if we had a nonnuclear preemptive strike option available to us, should we not use it?

Jessie looked at this new scenario with wonder. Given such a choice, he realized, his earlier decision lost its firm roots. Neither betrayal nor honesty was clearly right. The question ceased to be an engineering problem with a clear right answer: it became more of a political decision.

The colors of the main screen changed, red-lined flaws and green-lined deductions trading hues with stroboscopic speed. The new colors showed that in this nonnuclear first-strike scenario, the structure of the earlier argument collapsed. Of course, this didn't mean that a preemptive strike was right; it merely meant that a preemptive strike wasn't provably wrong.

Together, Jessie and Brad built tentative formulas for trading off right versus wrong subscenarios for nonnuclear strikes. The answers depended on the estimated probability that the opponent was planning a strike and the reliability of the attack systems. These new factors were no more quantifiable than the basic question. But they were more discrete, and less passion-provoking than the primary question, the question of when it might be justified to start a nuclear war.

The two duelists continued for a long time, lost in the ramifications of the possibilities they uncovered at high speed. At some time during the frenzy of analysis, a pale hand reached down and slapped Jessie's trackball, freezing both the cursor and Jessie's spinning thoughts. "Congratulations," Brad said with the same smile he had had earlier. "Welcome." They shook hands.

The duel ended in victorious accuracy: Jessie received his certification.

A forest infested with termites. The American war-making machine made Yurii think of such a forest.

The Soviet Union had known the true strengths and weaknesses of the American army better than the Americans themselves. KGB spies everywhere, even in the heart of the American weapon development system, saw everything, reported every major pulse. Yet in the forest of American military development they had missed the termites.

The Americans even nurtured their termites, like the ragtag group of the Sling Project. Here were termites that could fell forests even tougher than the dense wood of the American military-industrial complex. How could even the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

KGB track so many termites? They couldn't, until the termites, the projects, appeared on the front pages of the American newspapers. Since the end of the so-called Flameout, Yurii had read all about the Hunters of the Sling Project in the *New York Times*. Like the rest of the world, he had thus acquired vast quantities of information that should have been top secret. The Americans had even supplied high-resolution photos, the very best, in the silly paper! Americans were crazy beyond comprehension.

Yurii rocked in his chair, then stopped as a squeak from the springs disturbed him. For a moment he yearned for the good old days, when the General Secretary Sipyagin ruled—correction, the days when *Citizen* Sipyagin ruled. Yurii reminded himself that *he* was general secretary now. Sipyagin had been deposed as one of the consequences of the Soviet retreat from West Germany.

The burden of the general secretary's role weighed more heavily than Yurii had expected. As Sipyagin's closest advisor, the job of general secretary had looked little more difficult than advising, and it seemed to have fewer frustrations. But he realized now that this simplicity had been an illusion, an illusion only possible because Sipyagin had had no plans of his own to drive through the bureaucracy. Instead, he had had independent, vigorous advisors such as Yurii himself generating and herding plans through the system. If Yurii were content to let the other advisors continue their wayward performances, things would remain the same. But Yurii was most definitely not content to do so.

Even the office seemed smaller now, though it had a new, uncluttered look: the ivory figurines, and the bookcases, and much of the furniture, had left with Citizen Sipyagin. Barren planes of plaster and woodwork reminded visitors of the newness of the Soviet high comand. Still, Yurii had enhanced the office in a technological sense; a large flat computer display rose at an angle out of one side of the desk, and a teleconference screen coated one wall with its plain black surface. The blackness of the screen reminded Yurii of the unfathombly murky American thinking.

And the video monitor across the room also made him think of the Americans, for he had seen images of the American Minuteman silos on the screen just the day before. Men had pulled back the silo covers on missile after missile: 120 in all, according to the bean counters who tracked such data. Only Americans could let all those missiles lie naked in the sunlight, exposed to nuclear destruction from Yurii's own missiles. Those missiles were even exposed to the ignoble attacks of birds, spattering their droppings across the nose cones. It seemed disrepectful to the hellish power bound within.

Agonized, Yurii thrust the open-silo mystery aside, for other mysteries also blurred the future of his nation. Yurii glared at the American rocket launch reports again. The Americans continued to toss those damnable HighHunters into space at a phenomenal rate. Why? Could they be planning to destroy all of Russia's tanks and trucks, the way they had destroyed her ships?

His mouth became a hard line. He could not allow that. Without her armor,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Russia would become naked to the vengeful spirit of Polish, Czech, and Chinese hatred. Such a destructive move would require a nuclear retaliation. Was the new president, Forstil, so blind that he couldn't see that? Did Yurii himself have to tell the American such an obvious truth, bluntly, so that no terrible, world-engulfing error could occur? Forstil wearied him as much as the strong-willed bureaucrats in his own country. He could see no moment of calm sailing anywhere on his horizon.

Exhausting as these possibilities seemed, they did not disturb him so much as other possible explanations of the surge of American HighHunters. Yurii had reliable reports of disquieting modifications to the HighHunter Crowbars. The reports said these missiles were larger, and even more massive, than the ones used to destroy the Soviet Navy.

For a moment, Yurii snarled as his senior military-technology analysts had snarled, staring at these reports. Why would the Americans change a weapon that already overwhelmed everything else on the planet? General Mangasarian had recommended an immediate spaceplane launch to open up one of those demon cannisters and look at the new Crowbars. Yurii had rejected the idea. Hilan Forstil was every bit as unpredictable as Carson; a spaceplane assault on a HighHunter might trigger craziness, like a rain of HighHunters on Russia's spaceplane launching platforms. He could envision the effects a hundred ship-killing Crowbars would have on a delicate gantry.

Was *that* the purpose of the new HighHunter, to destroy Russia's space program by destroying her rocket launchers? To blind them by destroying their ability to launch spy satellites, so that they could no longer watch the American missile silos?

No, that made no sense either. The *old* Crowbars were perfectly capable of knocking out the satellite launchers.

More benign explanations for the new Crowbars abounded. Priorities had changed for the United States with the start of the war, and then again with the introduction of the Hunters, but now those priorities had returned to normal. The grand American military-industrial complex was like a balloon. It had deformed under the rigid pressure of war—but now that that pressure had been removed, the balloon returned to its old shape. The military-industrial complex had taken the contracts to build the new HighHunters away from the Zetetic Institute. The grand American bureaucrats were back in charge, the same ones who had "improved" their naval aircraft so much that they could barely lumber off the catapult. The new Crowbar could be just such an improvement, a new version designed to officialize the weapon with the stamp of pointlessness. Who could be sure—the new Crowbar might not even be able to kill a tank! It couldn't kill tanks as effectively, anyway: since the new Crowbar was much larger, you couldn't put enough of them into a Hunter to stop an assault.

Despite this reassuring possibility, Yurii worried that he had missed the key point someplace, though he felt close . . . With a rush of pleasure, he realized that he knew one person who *could* un-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ravel the mystery of the American Crowbars.

He remembered the black day when the Soviet advance in Europe ground to a halt. On that day, a crippled Major who had survived the Hunter attacks had spoken to them boldly of the results and significance of the American Sling project. With a few moments of firsthand observation and a few rumors, that Major had spelled out for them most of the information now displayed so prominently in the newspapers. That Major had had the gift for understanding technology and its consequences. That Major would look at these facts, and he would *know*—

A discreet knock at his door interrupted his train of thought. "Yes?" Yurii snapped with poorly disguised frustration. These continuous interruptions represented another flaw in the support system for the Soviet General Secretary: how could you even complete a thought between interruptions? No wonder the old goat Sipyagin had had such trouble keeping his attention focused!

General Mangasarian leaned into the room. "Have you heard about the newest crazy American plan?"

"What?"

Swaggering into the room now that he had Yurii's puzzled interest, Mangasarian waved a videocassette in the air. "President Forstil just made a speech. Nothing new in that—but he explicitly wants *you* to see it." His voice turned exultant. "We may have won the war."

"What?!"

Mangasarian loaded the tape in the Chairman's deck. "I hope you enjoy it."

Yurii turned to watch the tape.

The image flickered for a moment, then settled on a scene Yurii knew well. The American Presidential Seal glared from the podium in the foreground; the mute blue wall faded in the background. Trapped between these two extremes, between the bold and the bland, stood the most powerful man in the world.

A week ago, the man in that Oval Office had been merely second most powerful. Yurii ground his teeth in quiet fury.

The presidential face had changed so many times in the recent past, from Mayfield's face of a plastic puppet to Carson's face of a schoolteacher, and now to Forstil's face of a . . . Yurii's thought stumbled. Forstil had a look of stone, carved by lashing sea spray. An unyielding confidence lay upon him, the confidence of one who might not always win, but who always gave everything he knew how to give. And because he knew how much he had given, he had no guilt, no matter what the outcome.

This guiltless image of a president spoke. "Good morning, people of the world. I have good news today, news even better than the end of the recent war between NATO and the Warsaw Pact. Today I am here to tell you about America's plans to make the whole world safer." He paused, eyes glistening. "At least some of you have been watching us with baffled suspicion as we have called our Trident submarines into port. Even more of you have wondered about our motives as you have watched us blow back the seals on ten percent of our missiles, exposing them

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

to the eyes of any nation with a scanning satellite."

The stony face softened with a smile that seemed to surprise the president himself. "Some of you have wondered, *What are those Americans doing this time?*" His smile held a healing joy. "Well, wonder no longer.

"We Americans have set forth on a unilateral reduction in nuclear arsenals." The camera zoomed out, to encompass both the president and a television monitor. The monitor held scenes of sabotage of such grandeur as a KGB agent might dream of in his wildest fantasies.

An American soldier stepped to the edge of a Minuteman III silo and peered into the half-light of the deep shaft. With a theatrical flourish, the soldier fondled a grenade, pulled the ring, and dropped it over the edge. A flash of light, and a short puff of smoke, announced the end of the grenade, and the end of the life of the missile now damaged beyond flight repair. Yurii's eyes bulged.

Forstil continued to speak as though nothing unusual had happened. "As you can see, we are destroying these missiles and their silos. We will be destroying ten percent of our strategic nuclear forces every month for the next nine months, reducing our nuclear stockpiles to one tenth their current size."

The camera zoomed back in on a now-radiant president. "General Secretary Klimov, I urge you to launch a reconnaisance satellite of your own an hour from now, so you can see for yourself our sincerity and dedication to the plan of unilateral disarmament."

Yurii stared at the president with a complete loss of comprehension. Forstil's country had just won an extraordinary victory, yet now Forstil was throwing it all away! It seemed insane—but then, Yurii remembered that Americans had thrown world domination away before, after the second world war. Then they had discharged over three fourths of their men from the Army. Within a few short months of achieving total victory, they had enfeebled a military force of twelve million men down to a pathetic collection of less than two million soldiers.

Of course, at that time the Americans had depended on a trick gadget to ensure their ascendancy: they had depended on their new nuclear bomb, their precious monopoly.

Forstil continued speaking. "How can we dare to dismantle our defenses in this way? The answer is simple. In the past few weeks we have proven an important concept. We have proven that reliance on brute power does not strengthen its holder, it weakens. The nuclear forces of both the U.S. and the Soviet Union endanger us more than they protect us. For if we were so foolish as to *use* them, even if no one lived to fire back at us, *we would still be hurting ourselves!* Just the fallout and weather changes would hurt our own citizens. Does that make sense? Of course not. It is absurd."

"Henceforward, the United States shall depend on nonnuclear, Information Age weapons to defend itself. We will retain a small nuclear force: even in the Information Age, brute force remains dangerous if not counterbalanced. But this force will be the minimum necessary. We will never need enough

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

firepower to destroy an aggressor's civilization more than once." He paused. "Perhaps the absurdity of our Industrial Age arsenal can be seen in the extent to which it exceeds that need. We must learn to defend ourselves with rational means, before the irrational destroys us all."

Yurii found himself gripping his chair with wild excitement, an excitement like lightning that jerked him upright and discharged through him to the ground. So this was the purpose of the HighHunters flooding the sky! Forstil thought they could become the new trick gadget, the next-generation solution to cheap security that would replace the nuclear bomb in their thinking.

As the excitement discharged, Yurii relaxed in his chair. His worries and fears about America's Crowbars had been discharged swiftly and painlessly by the American president.

Of course, Forstil hadn't promised to destroy America's whole arsenal. America would not be at the unquestioned mercy of Yurii's missiles. But they would be so close—if the Americans really did reduce their nuclear stockpile to one or two hundred missiles, a preemptive first strike became quite possible . . . no, America's submarines would still pose a problem. Nevertheless, Yurii felt sure this would work to Russia's advantage.

Yurii jerked in his seat as Forstil used his name again. "We of America have now taken the first, largest step toward making our planet a safe place to live. I now ask general secretary Klimov to join us in our casting aside of self-destroying weapons. In a few months, the Soviet Union will be the only country in the world able to bring down nuclear devastation upon Soviet land. Join us in protecting your own country." It seemed as though Forstil's eyes locked with Yurii's, despite the distance in both time and space. The weary shock of Russia's recent humiliation pressed upon Yurii with a desire to stop struggling, to do as the president suggested, to dismantle his own nuclear forces.

But that would mean throwing away a huge lever, even as it was put into his hands. Yurii grimaced. Such an abdication of advantage could not be considered.

Not all Soviet citizens would agree with his opinion. No doubt this broadcast was penetrating Soviet airspace, reaching his people despite the Army's efforts to jam it. Oh, well. The Pravda discussion of Forstil's speech would require careful editing. And perhaps it might make sense in the upcoming months to destroy a token number of Soviet missiles. They could eliminate a few obsolete weapons and thereby solidify American public opinion behind Forstil's new course. Yes, he could see considerable merit in that plan.

The tape ended. Yurii savored the victory for a moment, then reflected on his suspicions. Could this be some kind of hoax? With a quick phone call, he orbited a satellite to watch the Americans destroy their own missiles.

Two hours later, he knew without a doubt the extent of the American insanity. The 120 missiles in exposed silos had been destroyed, utterly, unquestionably, and irrevocably.

It was funny, how in a quiet, darkened room one could be crushed with

LICENSED TO UNLOCKS
ELECTRONIC REPRODUCTION PROHIBITED

a sense of terror. Hilan had lived several nights in an exact duplicate of this room in the Pentagon. This war room where he now stood lay buried under Mount Weather, Virginia.

Though he had spent some time in that Pentagon war room, most of his mental images of this room came from trips made in dreams and nightmares, trips through thoughtworks wherein he sweated his way across burning visions of Armageddon.

The reality now seemed inconsequential compared to those nightmares. Here methodical discipline muffled the raw emotional undertone: the light and glare of the hot-line telecomm with Moscow lay in the Current Actions Center, behind the glass-walled control area where technicians swarmed. Here, separated from the clatter, Hilan sat at the long table with the Joint Chiefs and a variety of aides. Of course, no windows broke the walls of this quiet place buried beneath a mountain; the wall-sized display screen at the far end supplied a more relevant contact with the external world.

Hilan looked up at the display again. He did not shiver. As calm as this setting seemed, he wondered how calm he himself appeared. Any calm he might project, it was pure facade: he felt like a self-contained nuclear burst, the detonation surging in his body, trapped within the authority of his black pinstripe suit.

The war room would have been a dangerous place to hold this meeting before the War for Europe. Before the Flameout, Soviet submarines cruised within six minutes of an attack on Washington, six minutes from obliterating the war room in the Pentagon. Had the subs not been destroyed already, the fragile plan Hilan would now execute could not exist.

The long table held too many faces. Hilan picked out the key ones, unconsciously. Foremost was General Hansen of the Air Force, Chairman of the Joint Chiefs of Staff. He was a tall man, prone to sudden-breaking smiles, with silver hair. He had been a fighter pilot, and he still wore the ostentatious watch that was once so popular among the flyers. He sat serenely at the far end of the table.

Soft light came from the ceiling, eliminating shadows. A couple of people smoked; the ventilation drew away the smoke with brisk efficiency.

The display wall was an oversized version of the screen used by the Zetetics to hold decision duels. The technology here was more primitive, Hilan realized: the software for the display did not allow such flexible zooming and windowing. The absence of powerful software explained why they needed the entire wall for this setup.

Despite the huge display, however, the commander-in-chief had less access to useful information than did a second year physics student probing the atom for his first time. Plenty of information would come across that display, but little of it would be useful.

What did Hansen think of the plan they had come here to execute? Hansen might be turning purple inside, but that was submerged here. He was a soldier's soldier, calmly competent. He had objected to the plan at first as too risky. But a day's reflection and the weight of the ideas had made him a believer. He

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

would never bet everything on a single turn of the wheel, he had said. But here the alternative was to bet everything on the turn of the wheel, not once, but many times, every time a confused or uncertain president confronted Yurii Klimov.

General Hansen evoked in Hilan a sense of security, a delusionary feeling, to be sure. But Hilan had by now listened to too many Zetetic lectures to deny the delusionary feeling: *those who refuse to admit their own prejudices will remain forever enslaved by them.*

Hilan turned away from Hansen to look at the lower lefthand corner of the display. In that corner photos of the Soviet Union flicked methodically from scene to scene. Over 300 SkyHunters were sending those pictures of critical targets. A checklist adjacent to the images marked off the targets as, SkyHunter by SkyHunter, they accounted for each and every one.

The photos showed the sites of deeply buried headquarters, and buildings cast with meters of reinforced concrete. They seemed impregnable. But the targets being assessed were not the buried and reinforced buildings. The targets were the thin, delicate antennae serving those mighty bunkers. The men would survive, and in a few hours they would reestablish communication with the world. But for several precious hours they would be blind and mute. By the time they recovered, there would be no missiles or bombers to command.

The words to begin a war seemed so simple. An Air Force captain announced: "Ready to dispense."

Hilan closed his eyes for a moment, then looked into the captain's eyes. He held his breath, as if waiting for someone else to make the decision, knowing that no one else would.

In this last moment before sending humanity hurtling toward clear survival or clear destruction, Hilan did not think about the careful rope of logical thinking that had lead him here. He had inspected it from every possible direction, examined every fiber, every mar in its surface, every kink in its depths. The rope had kinks; it could snap; the world could fall from it. But he had examined the other ropes at hand with equal care, and though the rope he had chosen *might* snap, the others were even more likely to break. The logic of the rope fibers rested in a corner of his mind, but did not command his attention.

Nor did he think of his wife in Washington, his children in New Haven, or his aunt in Cincinnati. Earlier he had fantasized about moving them to places of safety in case the rope broke. But without the rope, no place could prove safe. If he would not risk his own family, what kind of fool would he be to risk all mankind? His family, he had decided in his earlier analysis, would be among the hostages he would hold over himself to make sure his decision was the right one. He had moved himself beneath the mountain not for his own safety but for the proximity to the hot line and the other devices that might make the difference between survival and extinction.

He did not think of the Zetetic Institute, or of Nathan Pilstrom who had devised this ingenious solution to the problem of thermonuclear missiles. Nathan had presented him with this dilemma. But he did not fall into the trap

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of laying all the blame for the future on the people who first saw that such a future was possible. Some of the blame—or some of the credit—did belong to them, but, at this moment, neither blame nor credit seemed important.

He did not think of Yurii Klimov, nor the possible outcomes of this evening's efforts. He had thought about the outcomes too much already, and he would need to think about them again soon anyway. Nothing could be gained by wrapping up his mind in a tight coil around the hideous possibilities that *might* ensue; he would need a clear mind to deal with whatever possibilites *did* materialize.

None of these people or events could capture his attention. Rather, a simple feeling held him, now that the decision making was over, and only the actions to solidify the thoughtstuff remained. It was a feeling of relief.

One way or another, by morning the terrible uncertainty would end. The terror that had hung over his whole life, that had hung over the lives of all the other people in America and Russia and the rest of the world for all of their lives, that terror would fade into history.

"Do it," he nodded to the officer.

They watched the display.

The HighHunter carried its own camera, and through this viewpoint the roomful of generals, admirals, and presidential advisors saw a thousand tiny points of light come to life above the Soviet night sky. The points streaked along majestic arcs, with the grace granted by gravity's guiding hand.

The captain who had initiated the dispensing of the SiloHunters muttered in awe, "It's like snow—or maybe sleet."

General Hansen, boss of the Joint Chiefs of Staff, grunted. "A sleet of steel, falling through the night."

A murmur rose around the room. Admiral Jenson frowned, along with General Plunket of the Army. Neither of them liked today's mission. Hilan agreed with their anxiety completely.

The camera view switched to an optically amplified image. The image came from a reconnaisance satellite. It focused on the fate of a simple disc of concrete thousands of miles away from both the satellite and the watchers.

The full thickness of the earth's atmosphere shimmered above the disc, making the disc seem to waver, insubstantial and anemic. Its grayish-white substance seemed more like a ghost than an implacable enemy, something that would swish away with the wave of a hand.

A streak of light cut the image and struck the ghost, shattering the illusion of both the light and the ghost. The streak disappeared as quickly as it had come, leaving a shallow, darkened pit in the platter, beneath a pale cloud of dusty shadows. A Crowbar had hit the silo cover.

Another streak of light cut the image, then disappeared from the far edge of the picture: a miss.

Another streak of light hurtled down, and dug a second pit into the disc's surface: a hit.

Another one missed.

Another struck, near midpoint between the other two hits. Now the whole surface of the disc disappeared under a rubble cloud that settled a moment later. The hair-thin fractures left by the first two hits, too fine to be seen even with

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the crystal-precise instruments of the recon satellite, now showed clearly in the chewed surface of the silo cover.

But that cover still held intact; no hole yet penetrated its full depth to the terror lurking beneath. This silo required at least two more hits to fulfill the mission, one to clear the broken shield, one to fall cleanly into the pit, to brush the monster missile with kinetic destruction. Only one more Crowbar fell toward that target, however. Helpless, Hilan watched as the last streak of light crossed, and missed.

Six shots of sleet they had allotted for each silo, two to break the cover, one to break the missile, one to miss, and two more just for safety. Here three had missed, and four had been needed to break the cover. The failure was too painful to feel: the agony numbed the mind, rather than piercing it.

The room seemed silent because Hilan could no longer hear anything, beyond the pounding of his ears. His mind raced in the kind of circle he had most feared. *Destroyed,* he thought, *the whole world will be destroyed.*

The rushing sound of his own blood filled his ears. He focused his mind on his own breathing; he let his eyesight fade against the mute tones of the wood-paneled walls, cutting off his vision along with his hearing. He breathed.

After a long moment (he didn't know how long, and he dared not think about how few moments he had in which to think), he searched for alternatives to avert total destruction. Certainly, the Soviets would know that if they released their missiles at this juncture, Hilan would retaliate. Even now, a spasm launch of missiles was not in the Soviet interest. But if Hilan could not offer them an alternative, something that would satisfy the human need for revenge, they might choose a convulsive retaliation despite their own interests.

What could he offer them? He had thought about this, along with Nathan and a dozen other men he respected, for hours on end. But none of the alternatives they had devised satisfied him. He could offer to dismantle more American missiles, and he could offer to do it faster, over the course of a couple of days instead of months. He felt sure this would not satisfy them, however.

He could offer them a city: one free shot against a city of their choosing. He almost lost control of his panic as he thought of this. *Total destruction,* the thought cycled in his mind again. But he forced himself to examine this hideous option. He felt sure it would appease the Soviets. It was better than the destruction of all civilization. Yet when Hilan thought of the millions of innocent people his mind rebelled. Those people were not responsible for Hilan's actions. Hilan would stand firm on simply disarming the US, and hope that the Soviets accepted that, before he would make an offer like that.

Of course, if the Soviets chose to undertake such an incremental punishment, by obliterating one city without Hilan's consent, what would he do? He agonized over this, and the alternatives they had collected for responding to *this* scenario, before admitting it was of secondary importance. Right now he needed to invent an adequate way to appease the Soviets. He needed to demonstrate for the Soviets that the United States had been punished, a punishment ter-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

rible enough to prevent American presidents from ever trying this stunt again. Yet it must be a punishment that did not require the murder of innocent people.

A punishment that would not harm innocent people. He faced a crisis here so difficult that he couldn't imagine a way of coping with it. Without thinking, he reached for the knife that had accompanied him up the mountain. He paused, contemplating the knife. Through the knife he saw into the past to the mountain, and to the place where he had nearly lost his life. He felt calmer.

And then he felt hopeful, for he realized that there *was* a punishment he could allow the Soviets to impose that involved no *innocent* victims. It was a third alternative he had thought of once before, dangling by a rope in a deep and deadly crevasse.

The strangled voice of a junior officer penetrated Hilan's meditation. "Thank God," he said. "The rest of them are getting through."

Hilan looked up to see another silo-attack sequence on the board. This time, the pattern of sleet struck with silent precision: a dead-center hit, that left visible cracks in the silo cover; a second hit, that left broken concrete rocks in its wake; a third hit that speared through the opening, to cut through the nose cone of the missile like a meat cleaver; and another hit that cleared most of the rubble from above before piercing the missile to its core in a second mortal blow. This second hit struck the fuel supply; a burst of light and fire spit back into the night from which the sleet had come, then settled to a glowing ember, deep in the shaft of what had once been a missile silo.

Hilan drew a long, shuddering breath.

General Hansen asked, with the tone of an order, "What's the ratio of kills to misses?" He leaned forward, squinting one eye at the numbers frothing in one corner of the display. "About 20 to 1?"

The officer in charge of the display nodded. "Yes, sir."

Hansen looked back at the president. "Good, but not as good as we had hoped. And not good enough, Mr. President. The Russians have over 2,000 missiles; if one in twenty survives, they still have over a hundred of them."

Hilan nodded. "Not enough to destroy the world, but enough to destroy the United States." How did this change Hilan's analysis? For one thing, it made an all-out Soviet attack even less rational from the Soviet point of view: they could not doubt, in these circumstances, that the U.S. could and would retaliate. Even so, Hilan's earlier analysis remained valid. He still needed to offer the Russians a sane way to punish the Americans.

He rose from the table with stiff precision. "I believe it is time to negotiate with Klimov." He walked past the glass control area to sit down with the hot line display system, confident that Klimov would be with him shortly.

Yurii began a painful ascent from deep slumber at the sound of mad, pounding boots. "Sir, we are under attack."

"What?" Light pounded against Yurii's closed eyelids; he winced.

And then he was in a helicopter, his robe flapping as he dressed in the dark, in the cramped space, in the screaming

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

noise of the rotor, in the heart-tightening fear that wormed through his soggy thoughts.

As he grew older, Yurii had more trouble waking at odd hours. A moment of empathy for the retired general secretary hovered on the edge of his mind, then vanished as his mind focused on the terror of the situation. *We are under attack.*

But Forstil had just initiated the destruction of his own missiles! Could that have been a ruse? Somehow, Hilan Forstil had seemed too sincere, in that American sort of way, to devise a trick of such scale.

Finally dressed, he set his shoulders and listened to the situation report. It was, in some bizarre sense, not as bad as he had feared. The information was fragmentary—the primary communications systems had been knocked out with superb efficiency—but apparently no nuclear weapons had been used in the attack. Just prior to the strike, the radars had noted the breakup of the new HighHunters, with the oversized Crowbars. Now that it was too late, Yurii understood the new weapon, and its purpose. Ah, the accuracy of hindsight!

The briefing ended too quickly, with too few facts. Yurii retreated to the hotline room with an army of translators, though Yurii understood English as well as many of them.

Hilan Forstil was waiting for him. The quality of the picture was uncanny; Yurii had not seen the system since the new high-resolution cameras had been installed. Forstil sat at a table, close to him; if Yurii focused on the oversized screen, it seemed that Hilan was with him, in Moscow, rather than half a world away.

"Greetings," the president said, "I've been expecting you." He smiled, the sad, stern smile of a doctor who has only precarious news for his patient's family.

Yurii glared at him, a flood of anger welling up, just contained by his awareness of the chasm between them, a chasm large enough to swallow them both. "You have stripped me of communications. I can talk to no one but you."

Hilan looked back calmly, his face suffused with sincerity. "Really? I would like to believe you. Heaven knows we tried our best to destroy all your communication systems. However, I doubt that we succeeded. General secretary, the Soviet Union has a *lot* of communication systems."

A feeling of near-amusement struck Yurii; in fact, the president was right. Yurii still had other assets, though coordinating them to carry out a plan remained problematic.

Forstil spoke again. "But though we failed to take away all your communications, I suspect that I know more about your current status than you do. Let me bring you up to date: your submarines are gone, all of them. Your bombers are gone as well: the handful you have in the air are under observation, and if they try to move in our direction we will destroy them quickly, even easily."

Forstil paused, to look away at a display that was hidden from Yurii's camera. "Your intermediate range missiles have been reduced in number along the European front, though a considerable

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

number remain. Of course, they aren't relevant now, since they can't reach the United States. Your forces along the Chinese border remain intact."

Hilan smiled almost mischievously, knowing that these were not the critical statistics "Your land based missiles have taken the most severe damage. Most of them have been destroyed. But you do have about a hundred ICBMs left."

Yurii nodded. His own people could account for about 30 operational systems; something on the order of a hundred seemed reasonable. Of course, the American president could be lying. Forstil could be giving him either a high estimate or a low one, depending on his purpose. Forstil had had more time to consider this situation. Yurii was sure the president had used that analysis time well.

Yet the man seemed so open and willing to share information; could Yurii use that? "President Forstil, your estimate is lower than our analysis suggests. Which hundred missiles are the ones you think are still operational?"

The president leaned forward, suddenly very serious. "We can't afford to play games here, general secretary. We have a planet to save."

For a moment Yurii couldn't control his anger. "You have attacked the sovereign territory of the Soviet Union! We can destroy your whole civilization!"

Forstil's sorrow returned. "Yes, you can. Of course, we can destroy yours, as well." He licked his lips. "Please remember that little harm has come to your people. The United States will of course pay retribution to the families of the men who have lost their lives. Frankly, I don't expect that to involve many claims."

Indeed, to Yurii's knowledge, only two men had died in the attack. One had been wounded. "You have destroyed billions of dollars of investment in our defenses!"

"We will destroy a similar set of investments in our nation. We have already started, as you well know. And we were the only reason you needed all that hardware in the first place."

"Your trivial destruction of a few Minutemen is a ruse and a hoax, designed to trick us into lying still while you grasp world dominance!"

Forstil shook his head. "Yurii Klimov, you are the most astute general secretary the Soviet Union has had in a long time. And you are the most sophisticated analyst of Americans ever to hold your office. You have studied me. I am destroying the American strategic missile force. Soon we will have no more missiles than you have today. Klimov, I have no reason to lie to you on this matter. What value would more than a hundred nuclear missiles have? What value did they ever have? Have you personally slept any better with thousands of these monsters than you did before? I can't believe it."

The open weariness of the American struck Yurii with surprise. Even more surprising, Yurii recognized the same feeling within himself; a weariness with the wrestling match he had conducted all his life, under the shadow of nuclear terror that was insane in its intensity. He looked away for a moment as he realized that, one way or another, the shadow that had haunted him would now become lighter.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

A feeling of optimism followed. He began to believe that the American *would* destroy America's missile force, just as he had destroyed Russia's. Yurii started to tell the president that the Soviet Union had planned to follow America's lead and reduce its nuclear force, but cut off his own words. The president was right; this was not a time for games.

Still his anger remained. His country had been attacked!

He wanted to launch a counterstrike, to destroy the American ICBM silos in return. This course of action seemed like proper justice. But he did not have enough missiles, even if he had the command and control systems to arrange it. Besides, the Americans would destroy those silos for him.

He glared at the president again. The president, he realized, had been studying him intently these past few moments. Yurii suddenly despised the high resolution television system that betrayed his every movement to the American. He fought a desire to order the camera shut off, sensing that such a reduction in personal contact was the first step to oblivion. Yet oblivion seemed inevitable; what recourse did he have, but to strike back at America's cities? He *had to* respond to this attack! What else could he do, other than destroy American cities?

Hilan Forstil seemed to read his thought. "This is a personal confrontation, general secretary, no matter how it affects the world. You must not blame the United States for the destruction of your missiles. The United States did not initiate this attack against you. I did." The president seemed to grow in presence; the sincerity in his eyes reached out, convincing. "Blame me. If you feel you must punish someone, punish me."

"Very well, President Forstil. I shall blame you." His face twisted with fury. "But how do I punish you?"

"With my hand. With yours." Now the president opened his right hand; it contained a bright red Swiss Army knife. With hypnotic, casual grace, Forstil opened the blade and brought it to his own throat.

A gasp arose from somewhere off-camera. Forstil frowned at the sound, then turned back to Yurii. "Kill no innocent people, Yurii Klimov. Kill only those who are to blame. In killing them, you will get your message across most effectively. Let this nightmare end with the guilty."

Yurii stared at the knife. The steel blade flickered in the light, clean and precise in its deadly intent. It seemed so small, yet so perfectly lethal—truly, a proper mate to the surgical Hunters that had excised the Soviet arsenal. Except that *this* surgical weapon was under Yurii's control. At least Forstil claimed that it was under Yurii's control.

Control. Control of the environment. Control of the self. No man reached the pinnacle of Soviet power without understanding control. He believed Forstil: he believed that he himself, not the American, controlled the knife.

And he wondered, did he control the knife, or did the knife control him? Yurii could not take his eyes away from it.

His eyes slid reluctantly down to the smooth plastic handle, held in a firm but easy grip. Yurii had an identical knife in his own desk. For a moment this

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

thought gave him a sense of kinship with the president; he could feel the smooth surface sliding between his own fingers, tapping a fingernail against its unyielding strength.

Afraid of too close an empathy, he jerked up to look at the American president. And here he found a break in his rapport with the man who offered his life: Forstil looked back with steady eyes, eyes that held no trace of guilt or fear.

It provoked Yurii to another outburst. "You launched a sneak attack against us! Without discussion, without warning!" he screamed, trying to extract some admission of guilt. "Of all the people in history, you most deserve to die for starting this holocaust!"

"Yurii Klimov." The president's voice was soft, almost a whisper. "If our positions had been reversed, what would you have done?"

If he had had the chance to so cleanly neutralize America, what would he have done? The answer struck him like shards of ice flung in his face. He suddenly saw generosity in Hilan Forstil's actions.

The president was speaking again. "Frankly, it doesn't make any difference what you might have done. I am the one who did it. General secretary, the vengeance you seek, in your belief that it is justice, is in your hands. It is yours for just the slightest motion." His knife tip pressed against yielding flesh.

Yurii had the American totally in his power. To kill this man would indeed send a potent message to anyone foolish enough to think about his stunt again. Yet, the thought continued to haunt him, *what would I have done in the same situation?*

He must have moved his head, for he saw the president's hand grip more firmly, a last tension before plunging the knife home.

Yurii leaped up. "No!" he shouted. "I will not take your miserable life."

The president's fingers relaxed, though for a long moment his expression remained the same, as if not quite believing his reprieve. Then he smiled, that same sorrowful smile. "Thank you." He looked to the side, and his smile became wider, yet also more sorrow-filled. "And now it no longer makes any difference."

Yurii looked at the president, puzzled, until Forstil explained. "A second wave of SiloHunters just struck the Soviet Union. Chairman, I regret to inform you, that your country no longer has a strategic nuclear force."

Yurii stood very still. "Will you still destroy your missiles?"

Forstil nodded. "Of course. Why not destroy them? They're pointless now anyway."

Curiosity overcame his deeper concerns. "Tell me, President Forstil, would you have really used that knife, knowing you only had to hold out for a few minutes before I would be reduced to impotence?"

Again Forstil nodded. "I always keep my word, Yurii Klimov."

A new emotion struck him now that it was all over: the sense of loss, a loss that gave way to bitterness. "Well, you did not need the knife. And now, instead of death, you have earned world domination."

The president burst into laughter. It

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

swelled, growing almost hysterical in its release of tension; then it disappeared as quickly as it had risen. "So it might seem to you. And indeed, in some bizarre sense I have great power over all the nations of the world except one. I might control the world, Yurii Klimov, but I can't control my own people. I think you'll find this leaves me with no more world control than you have." He paused reflectively. "But one thing I can assure you. Your own country, the Soviet Union, is safer now than it was just an hour ago. I'm sure you don't believe me now, but in time you will. Sleep well, general secretary, knowing that from this night forward, sleep will be much easier for everyone." The screen darkened to black.

Yurii stared at the blank screen for a long time, wondering if the American spoke the truth. Just maybe, in ways he could just begin to see, Forstil might be right.

Nathan had lived this nightmare exactly one year before. He remembered the waking in the middle of the night at a chance sound, the terror of a ringing telephone, the horror of waiting. One year ago, he had waited, knowing that soon the ringing telephone would end with a polite voice telling him to come to the hospital, telling him that his sister Jan had finally escaped from the agony of dying by passing through death.

Now he waited again. This time the outcome was not quite so certain; even now the doctors were trying a radical new surgery. There was a chance, delicate as a snowflake, that Nell might survive. Still the ringing of the telephone frightened him.

He waited in different surroundings. Entering the Blue Room, he joined Hilan Forstil in this vigil. Nathan hefted the small metal disk concealed in his right hand and tried to smile. Sunlight through the bay windows made it warm here; the air tasted dry.

Nathan watched as Hilan stared out the window, shifting his weight from side to side, left, right, left. "Mr. President," Nathan addressed him.

Hilan turned. His lips pursed tightly together; other than that, he looked calm.

Nathan continued. "I have something for you. A medal." He opened his hand and waved the dingy metal disk, dangling from a rainbow-colored ribbon.

Hilan looked puzzled. "Tsk, Nathan. You know I can't accept gifts. It's in the Constitution."

Nathan chuckled. "I suspect they'll make an exception for this one. After all, we had to make an exception too, to give it to you." He held out the disk. Hilan reluctantly took it. His puzzlement grew.

The disk was made of an undistinguished alloy of common metals, a gray monotone. It looked like a Boston subway token, save for two words inlaid in silver. The words "Rationality Token" flashed against the dull metal background.

Hilan flipped it over several times. "A rationality token? Just what is a rationality token?"

"It's a tradition," Nathan explained. "A Zetetic tradition that goes back before the birth of Zeteticism." He smiled; at least for a few moments this story would take his mind off of Nell, and Jan. "Years and years ago, a friend of

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

mine noticed an odd thing when he went to meetings with large groups of government bureaucrats. He would take a list of questions to each meeting, and put forth each question to the assembled body. He found that, for each question, one bureaucrat in the room would have something rational and intelligent to say; the rest would answer either with a magician's verbal handwaving, or with statements that were internally inconsistent, or with statements that had no connection to the topic.

"Oddly, for each question, a *different* bureaucrat gave the rational response. It seemed as though a law of nature were in effect that prevented more than one bureaucrat from being rational at one time. And you could never predict beforehand, which lucky bureaucrat could answer a particular question rationally.

"So my friend developed the theory of the Rationality Token. In this theory, a roomful of bureaucrats shares a single rationality token. Whoever holds the token can act intelligently, but no one else can. And the bureaucrats pass the token around, secretly, in between questions."

Hilan thought about this for a moment, then pointed at the Rationality Token disc in Nathan's hand. "If you go around handing out too many rationality tokens, you could find yourself violating this natural law."

Nathan clapped his hands. "Exactly! After sitting through these kinds of meetings for several years, my friend noticed that, scattered amongst the bureaucrats who shared tokens, there were special people. These special people were *always* rational, on all questions. My friend expanded his theory to include the notion that some people carried their own rationality tokens with them wherever they went, and as such were not bound by the laws that governed the others."

Nathan took the token in his hands, and slid the ribbon around Hilan's head so that the token dangled on his chest. "We established the decision duel to train people to such heights of rationality that they could always carry their own tokens. At the graduation ceremony we give the graduates their very own Rationality Tokens. As you can see, the token is not only useful for rationality; it is also good for a single trip on the Boston subway in case of emergency."

Hilan laughed. "But I'm not a certified decision duelist."

"No. But someone clearly displayed full rationality in a decision duel that took place the day before the Night Of Steel Sleet. Someone devised an insightful third alternative, an alternative of preemptive mutual arms reduction. I would like you to hold his token for him until we find him, whoever he was."

Hilan nodded. "I see." His hand closed over the token, clenching it. "Thank you. I'm glad you think I did the right thing." Tension flowed across his features. He turned his back to Nathan and stared out the window across the south lawn of the Ellipse. Sunshine poured in, outlining Hilan as a lonely figure.

Hilan shook his head as if to toss off an evil spirit. "I remember walking past the Blaire House, where Ronald Reagan was staying, the day before Reagan's first inauguration. It was cold and damp, a typical Washington winter day." He turned to face Nathan, though he still

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

looked back into the past. "The street was lined with bleachers. Scattered through the bleachers were desolate, sad people, all staring at the Blaire House. Those people didn't know Ronald Reagan, but they knew he would be different from Jimmy Carter. They had no rational reason for believing that Reagan's arrival would improve their individual lives. But they still stared at the house. They seemed to think that if they could just catch a glimpse of the new president, just the vision could change them. Those sad, desolate people stared at the windows of the Blaire House with *hope*." He laughed. "And you know what? I wanted to join them."

He sighed. "They're out there now, watching for a glimpse of me. They love me without question. The gamble I played with their lives paid off, and now they believe I can do no wrong. I hope it lasts, at least long enough for me to keep my word with Klimov. I've accelerated the schedule for dismantling our missile silos. I hope that in the long run, what I've done helps the people who watch presidents from the bleachers with their sad but hopeful eyes."

Nathan nodded. "At least they know that *you* have changed their lives."

"Have I? You know, the Russians and Americans might have worked out a peaceful world without the Night of Steel Sleet. As it is, the world may be safe for democracy, but it isn't safe from hate. When I initiated that Night, I *increased* the hate. The Russians hate us more now than ever before. We'll probably never know whether I made the right decision."

Nathan shrugged. "Your solution might not have been optimal, or efficient," he conceded. "But at least it was *effective*. Too many of the people who have shaped the world have never even achieved that much." Nathan snorted. "I'm already annoyed when I think about the historians a hundred years from now. Some damn fool will look back on our story—the story of the birth of the Information Age—and prattle about the sweeping inevitability of our victory. Idiots!"

Hilan laughed. He moved out of the sunlight. "Certainly no Zetetic would develop or believe such an unsane view of history." His smile held just a hint of mocking amusement. "And surely the Zetetic Institute will destroy all the bureaucracies and rule the world."

"No!" Nathan was surprised by his own vehemence. He softened his tone. "At least, I hope not. I designed the Institute as a temporary structure, a scaffold, on our way to new and better Information Age organizations. Most of the good in Zetetic philosophy should be absorbed by the school system, and maybe the corporations. Zeteticism as such would then disappear, because it would be the norm; it would cease to be distinguishable from the background of normal society. If the Institute continued on indefinitely, then we would have merely created another institution. We would have failed."

Hilan waved his hand expansively. "Do you believe that only teachers can learn from you? Then what about *my* institution, Nathan? What about my bureaucracy, the United States government?"

Nathan looked into the distance. "I believe you are obsolete, Mr. President."

"Really! And who will replace me?"

Nathan shook his head. "No one will

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

replace you, Hilan. It's the office you occupy, as head of a nation-state, that will be replaced."

"What will replace it?"

Nathan's forehead creased in concentration. "I don't know. I can't see it yet." Tears glittered in his eyes. "Perhaps Jan would have known. She often saw the future more clearly than I, though she never tried to look too far." He shrugged. "When the time comes, I'm sure someone will know. It may not be our problem. Not all the ramifications of the Information Age will settle out in our lifetimes."

"Thank heavens! We already have too much to do."

The telephone rang. The sound swept Nathan's mind with electric terror; was this the call from the polite men from the hospital? Was it over? Was it too late?

He had never told Nell he loved her; he had been a coward, insufficiently self-assured to think of himself as a proper consort for a Madam President. Had she felt the same? Why had he waited?

Hilan's steps sounded soft as he walked across the room to pick up the obscenely ringing instrument. Hilan's tense impassivity turned to a serious frown as he listened, then changed to mischievous humor. "Thank you. We'll be right over." He hung up and headed for the door. "I think you'll want to come with me," he said over his shoulder to Nathan.

"Who was it?" Nathan's pulse pounded as he asked.

"Well, it seems my obsolescence has already caught up with me. I'm about to be evicted from the White House." He opened the door to let Nathan go through first. "It seems that Nell has just regained consciousness. They think she'll be fine."

Nathan froze; then his eyes widened, and joyful warmth suffused his whole body. "A miracle," he said simply. It was funny, Nathan noted, that even he himself could sometimes take the goodness of the world for granted. Even he needed an occasional miracle.

A critical part of Zeteticism was the training that taught one never to take the ordinary for granted, to always be a little bit pleasantly surprised when events went as expected, to never lose the sense of wonder. Nathan had never lost his sense of wonder despite the loss of Jan, and the jeopardy of Nell. But with Nell's return from danger, every detail of his universe shone brighter. He appreciated the air he breathed, the scent of Washington springtime, the metallic polish of the limousine that stopped for them, the texture of the leather seat, the quiet rumble of the engine, the pressure of acceleration, the glow of the green light, the blue sky, the soft clouds, the antiseptic smell of the hospital, the bright white of the walls, the cold metal of the bed rails, the warm smile on Nell's face.

Nathan lingered there, in the wonder of Nell's smile, for a very long time. ■

EDITOR'S NOTE: Like any story drawn from the real world, "The Third Alternative" exists in a much larger context. The Zetetic Institute is a big, important concept, and a story this length can only begin to explore its possible implications for our future. To read much more, see Marc Stiegler's novel David's Sling, *to be published in December by Baen Books.*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

on gaming

Matthew J. Costello

Not long ago I had the pleasure of interviewing Noah Falstein, game designer and developer for Lucasfilm Games. The subject was the future of games, and it led to last month's article on DVI—the digital video interactive disc.

But surely you read all about that in last month's *Analog*.

At that time Noah Falstein mentioned something else about games, something about the here-and-now, that was interesting. He said that the response to Lucasfilm Games' fantasy and science games, most of them released by EPYX, has been decidedly lukewarm. It appeared that the fans of *Star Wars* and *Star Trek* weren't clamoring for inventive computer games in their genre.

No, what they seemed to want was a good, old-fashioned war game.

Now, I found the Lucasfilm games that were released (such as *Koronis Rift* and *The Eidolon*) a bit obscure. The games tried to introduce too many new concepts, without the backdrop of a film or a book, so that it was hard to get emotionally involved in the plot of the games, or to learn the mechanics of playing them.

Lucasfilm Games, in a surprise about-face, has recently released *PHM Pegasus*, designed by Falstein. Its high-tech, militaristic theme—a hydrofoil gunboat patrolling the troubled waters of the Persian Gulf—is an abrupt change for Lucasfilm games and it's a change that works wonderfully as a game of "future combat."

PHM Pegasus (Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404) is described as a *Patrol Hydrofoil Missile Craft Simulation*, but it's no dry simulation. The PHM Pegasus uses hydrofoils, or underwater wings, to fly underwater. These fairly heavy ships can move extremely fast, with maneuverability undreamed of by a standard vessel. The accent of the game is on combat, and I felt more like I was in the middle of a *Don Winslow in the Navy* serial from the 1940s than the latest entry in the Mid-East war of nerves.

The program provides two screens, an operations map that marks your current position and your goal, and an instrumental and weapons systems display that tells your PHM's current speed and weapon status. It also shows you the dead-ahead bridge's view with an added "binocular" display that is used for aiming weapons at targets.

The weapons provided with the PHM make it a tough little fighting vessel. There are Harpoon and Gabriel guided missiles, a 76 millimeter water-cooled naval gun, and, for those touchy moments when a missile is about to blow you out of the water, rapid blooming chaff.

(continued on page 126)

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Probability Zero

PROALLOGNOSTICATION

Andrew Giesler

"You did say 'Hippie,' Dr. Morrison?"

"Hippie? Yes. H-P-E. Hypochronous Proallognosticating Entity." He seemed uncomfortable here, his fists jamming fiercely into his pockets. The reporters, struggling with spellings, waited for an elaboration. Morrison rocked on his heels for a moment, and shrugged. "That's what it is. The Hippie." It was a squat, moist, grey thing, sitting on the floor beside him and pulsating quietly. Before it lay a single red rose.

"Doctor, could you elaborate on . . . on how it *does* it."

He frowned. He wasn't sure of the details; his students had designed the thing. No need to reveal that. "Well," he frowned, "it uses the principle of *proallognostication in, well . . . in* a hypochronous way."

A collective chuckle simmered through the throng. "Doctor," said one reporter, "I'm afraid you'll have to explain a little further. You said it prognosticates? Hypochronously?"

"No, no. It pro*allog*nosticates. Hypochronously yes. Sort of . . ." he gestured lamely, waving his hands above his head, "sort of *below* time. Let's just say that it has far too much to do *in* time . . . so it goes below time. The details are unimportant." He didn't know details.

"But doctor, 'proallognostication.' What is it?"

That he knew. "Proallognostication, literally 'knowing something else before the fact.' *Prog*nostication is predicting something correctly. Pro*allog*nostication is predicting something incorrectly—absolutely so."

"But why would anyone want to do that?"

He sighed. "It's an ancient principle really. For example . . . well . . . when we go to great lengths to avoid something, and then it doesn't happen anyway. We're certain that it will, but it doesn't. That's not just coincidence; a causal relation was proven some years ago. The greater the lengths to which you go to avoid something, the less likely that thing is to happen. You can see early references to it in the collected works of Murphy, et al. It's just been a matter of determining why the principle works, and getting a CE—crafted entity—to take advantage of it. And . . . well . . . that's what we've done."

"I don't see. Do you mean the . . . the Hippie . . . made that rose appear like that by not worrying about it?"

He laughed mirthlessly. "Oh, if only

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

it were that simple. No, Hippie makes things happen by worrying that nearly everything *else* will happen."

"I don't understand, Doctor."

Well . . . as it turns out, proallognostication works because we fear with some measure of certainty that something will happen. The more you worry that some event will occur, and the more certain you are that it will, the less likely it becomes. The Hippie channels probabilities, if you will. If you decide, say, to turn a rose into a frog, the Hippie worries about very nearly everything else—that our sun will supernova, that the oak tree in my front yard will begin to bleed, that my shoes will go out of existence."

He stopped and shook his head. This would be difficult to explain. "You see, only a certain number of things can happen at any instant in time. More important, a certain number are required to happen at each given instant. The Hippie is such a sincere little homunculus," he smiled, patting it gently, "that anything which it anticipates is actually prohibited from happening. Well . . . if you prohibit enough things from happening, it becomes very likely that the thing which you told Hippie *not* to worry about *will* happen. Hippie, would you change the rose into a frog for me?"

The reporters watched silently as a frog hopped off the podium and out the open door. Morrison smiled. "You see," he said, "Hippie here just worried about nearly everything *but* the rose turning into a frog. With great intensity and sincerity."

Slowly the reporters stirred. "*Nearly* everything, Doctor? You've said that twice. Why not have it worry about *everything* else?"

Morrison smiled. "Well . . . I don't know. Hmmm. Let's see. I'll have it worry about everything but, mmm, a lamp appearing here. Hippie, would you do that for me?" Hippie began to rock and hum.

"Uh, Doctor." Morrison looked at his students in the back row. They seemed unhappy. One was standing and waving her hand. "Doctor, I don't think that's such a good idea . . ."

Morrison grimaced. "Well, why not?" Hippie's hum shook the floor now. "Why bloody not? I thought it was a *good* idea." He smiled at the reporter who had made the suggestion. This was wonderful. One of his own students was challenging him in front of The Press. There'd be hell to pay later.

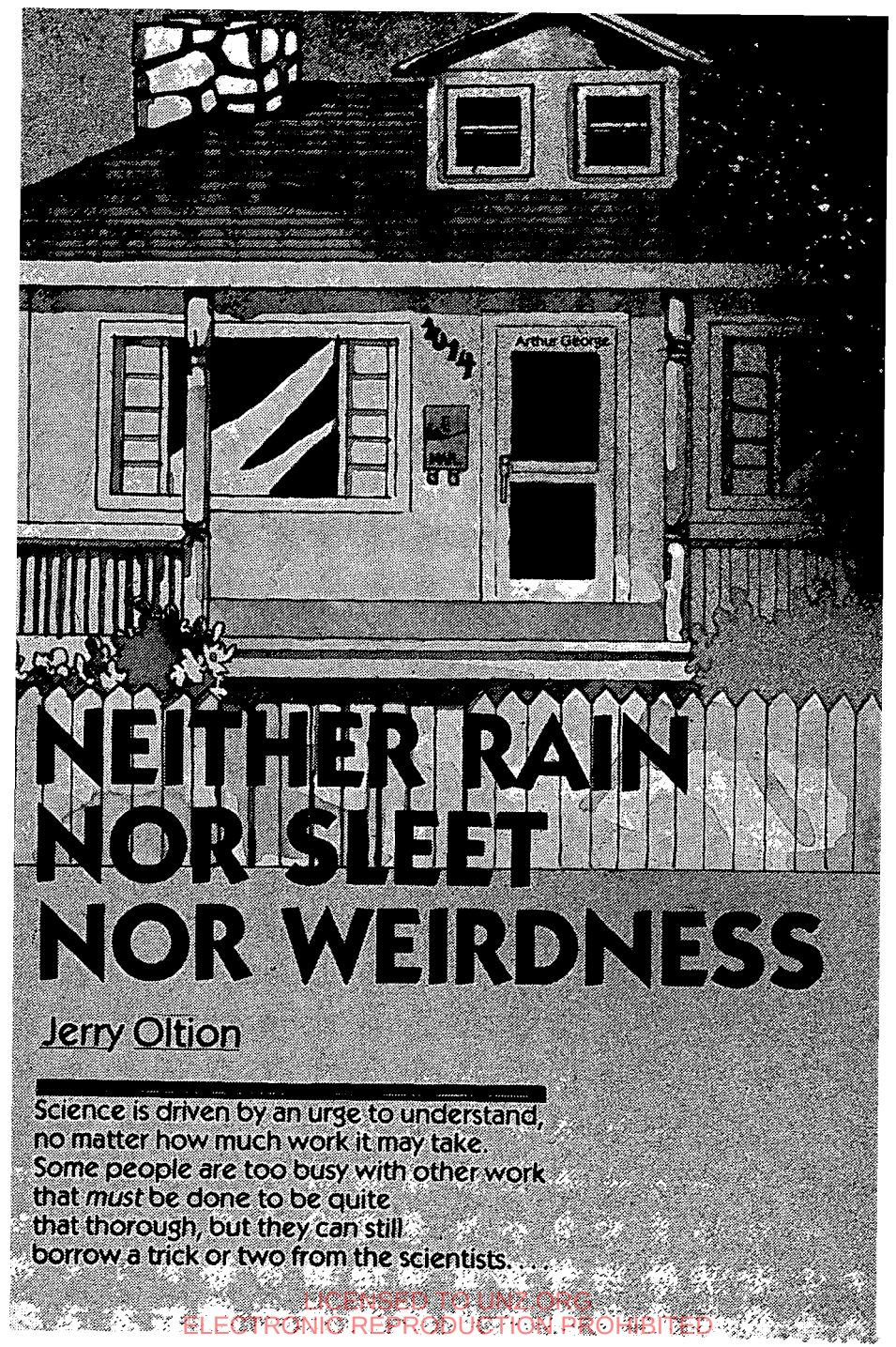
The walls shook in sympathy with the floor; Morrison seemed to be vibrating across the stand. "Doctor," she yelled above the hum, "if it worries about everything *else*—". Another stood. "Doctor! Stop it!" he shrieked.

Morrison, barely keeping his footing, grabbed at the pencils hopping out of his shirt pocket. Two students tried frantically to push through reporters to the front, yelling "Bill! Stop it!"

"Why?" he vibrattoed through clattering teeth. "What could possibly . . . ?"

In the nothingness there was a light—small, with a walnut base and a tastefully befruited shade. And it was a good light. ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

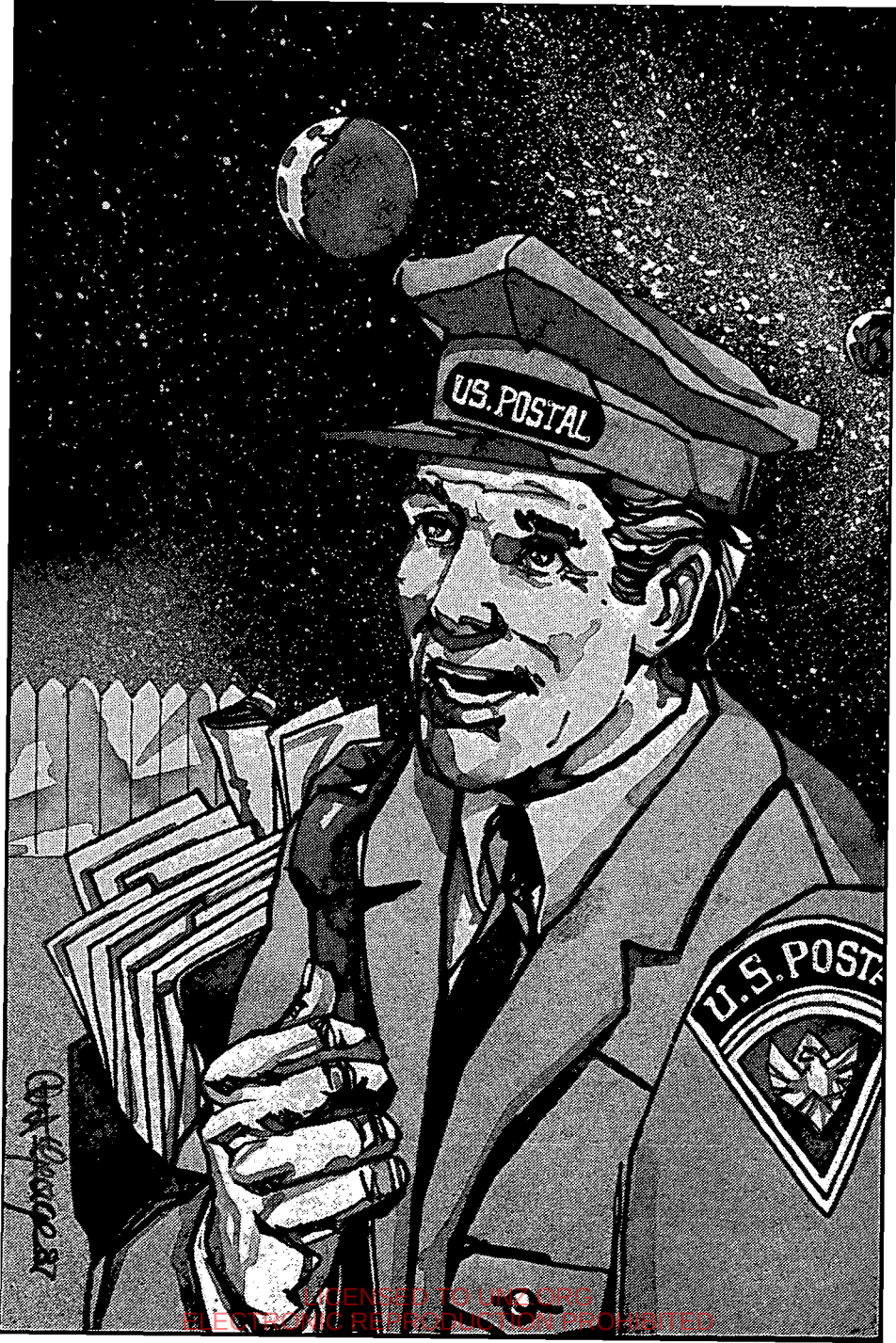


NEITHER RAIN NOR SLEET NOR WEIRDNESS

Jerry Oltion

Science is driven by an urge to understand, no matter how much work it may take. Some people are too busy with other work that *must* be done to be quite that thorough, but they can still borrow a trick or two from the scientists. . .

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Greg had seen strange names in his sixteen years as a mail carrier. Most of the ones on his route were familiar enough to seem normal to him now: Dinkie Winkel on Aspen Drive and Khanibrostu Khan on Cedar Lane and even Normel Strainge over on Tenth Street, but every now and then he'd run across a new one. Like the one he held before him now: Iptch Tswana, 1014 Meadow Lane.

He looked at the envelope. It was a plain number ten, lick-stamped and hand addressed, so it wasn't likely that a computer somewhere had mangled a name like Ivan Tanner to get that spelling. No, whoever had written it had either mangled it on purpose or had copied the name from someone who had. And they'd mangled the address in the process. There was no 1014 on Meadow Lane.

But the city was right, and the zip code. It must be somebody staying with the Fraleys, he thought. They were 1012. Probably a foreign student by the name, though the letter was postmarked New Jersey.

He rapped the envelope against his sorting case while he tried to decide what to do. Technically when he got mail for a nonexistent address he was supposed to return it to the sender, but if it *was* for somebody staying with the Fraleys then he should probably just deliver it, bad address or not. He supposed he could take it along and ask, and if it wasn't for anyone there then he could send it back tomorrow. Yeah, that was what he would do.

But Iptch Tswana. That was a good one.

* * *

He forgot all about the letter until three o'clock that afternoon. Normally he would have reached Meadow Lane by two or two thirty, but his jeep had gotten a flat tire just after he'd left the post office and no matter how hard he tried he couldn't seem to make up for the time he had lost changing it. He wasn't so late that he would have to put in overtime to finish the route—he usually had time left at the end of the day—but all the same it bothered him to be behind his normal pace.

The reason it bothered him waited behind every curtain and screen door on his route. He delivered in the older part of town, still a nice neighborhood but given over mostly to retired couples or widows who had little else to do with their day than wait for the mail, and when he was late Greg could sense their heightened expectation and he could feel their eyes following him up the street when he finally did arrive. And what was worse, the mailboxes were up on the houses instead of out on the sidewalk like they were in the newer parts of town, so he had to open the gate in the picket fence that guarded nearly every house, walk all the way up to the porch and put the mail in the box, and walk back to the street under the watchful eye of the house's silent occupants.

It was spooky. They never came out while he was there, but waited until he was walking down the walk away from the next house down before they ventured out to see what he had brought them. He heard a steady progression of screen doors banging and mailbox lids clunking down behind him, but he never saw the people in the houses. They could be aliens for all he knew.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

He was tempted to turn around and look occasionally, but he never did. It would be violating some sort of unspoken agreement. He could almost imagine the squeal as women in bathrobes, their hair in curlers, scurried back inside their houses in indignation. Then they would probably call the postmaster and tell him that their mailman was "looking at them," and there would be no end to the ribbing he'd get from the other guys at work.

No, it didn't pay to be too curious. A lot of people were already sure that you read their mail; there was no sense giving them provocation to call you a Peeping Tom, too.

Besides, he did see some of them on occasion, like when a package was too big for the box or when somebody got a certified letter. The court had taken to certifying their jury summonses in order to have proof that they were delivered, so every now and then he had to ring the doorbell and get a signature. It was a trick of sorts. People could always refuse mail, even certified letters from the court, but they had to come to the door to do it and that at least told the court—and Greg—that somebody was home. People seldom refused mail anyway, especially if it was certified. Their curiosity wouldn't let them.

But there were no certified letters today. He parked the jeep at the corner of Eleventh and Meadow Lane, shouldered his bag, and headed off up the odd side of the tree-lined street, feeling the eyes watching him all the while. The sensation seemed stronger than usual today, even stronger than the tingling at the back of his neck that he usually felt as he approached Ginger, the Kovarichs' aging Doberman at 1006. He'd read somewhere that a Doberman's brain never stopped growing, that as they grew older the pressure in their skull drove them crazy, making them even more likely than usual to tear your throat out. Like most carriers he had a can of Mace clipped to his belt, but he dreaded having to use it. Mace just made a dog madder, made him that much more likely to go for you. The way to treat a dog was to ignore it, treat it like a tree or a tricycle or any other piece of lawn junk. Don't acknowledge it. Most of all, don't *fear* it. Dogs could smell fear. He tried to ignore the feeling of being watched the same way he ignored Ginger, but the more he thought about it the worse it got, until it seemed he could hear every whisper of movement behind him as people abandoned their posts by the window and crept out to sneak the mail out of their boxes.

I will not look back, he thought. He forced himself to smell the flowers in the neatly planted beds alongside the walks, to listen to the leaves rustling in the enormous cottonwoods that lined both sides of the street—anything to avoid letting it get to him. It seemed to be working, too, until he reached Seventh Street, crossed over to the even side of Meadow Lane, and started back. There, instead of weakening still more, the sensation grew stronger, which made no sense since he was headed back toward the jeep and relative sanctuary. But his determination to ignore it grew proportionately, so much so that he was only one door down from the Fraleys when he noticed the new house.

It hadn't been there yesterday. He stopped and stared at it in open surprise:

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

a light eggshell blue house nestled in between the Fraleys and the Douglasses. It had that boxy look common to prefab houses, but if it had come in on a trailer there was no sign of wheels now. Not even tire-marks in the grass. There was already a picket fence around it, and yes, a mailbox beside the screen door, right under the numbers 1014.

That had to be the fastest he had ever seen a house go up. A single day from bare ground to picket fence. Evidently the Fraleys and the Douglasses had each had a lot and a half, and this new person—he took out the letter as he began walking again and read the name—this Iptch Tswana had bought the middle ground.

Well, that solved the problem of delivering the letter. It created a problem back at the office—he would have to rearrange all the slots in his sorting case after 1012 to accommodate the new house, and for a couple of weeks until he got used to the new arrangement he would be putting mail in the old slots out of habit—but that was part of the job.

Just like this sensation of being watched was part of the job. He was feeling it more than ever now as he walked away from the Fraleys and toward the new house. It was almost a physical presence in his mind, a tension that grew with each step toward the gate. The tingling at the back of his neck was almost an itch, demanding that he whirl around and face the monsters sneaking up on him . . .

When he put his hand on the gate it was as if an electric shock went through him. He lurched, steadied himself on the post and straightened up, shaking his head. This is ridiculous, he told himself. The fence is just a wooden picket fence. The house is just a house. The shadowy figures peeking around the curtains are the same shadowy figures that you see in every house on the street. No big deal. Deliver the mail.

He even managed a soft whistle as he walked up to the porch, realizing belatedly that it was the repetitive dum-Do-dum, dum-Do-dum of the *Jaws* theme. He stopped whistling and opened the mailbox lid, dropped the letter inside and let the lid bang shut, then turned around and walked the distance back to the street while the back of his neck tried to crawl up under his scalp. At the gate he felt the same shock as before, but this time he didn't stumble.

Six more houses to the jeep. Then five, four. The farther he got from the new house the less he felt the presence in his mind. He began to relax. He'd been about to say to heck with being late and take a break over in the park for a few minutes, but now he decided to go ahead and finish the route first. Get it over with and then go wiggle his toes in the grass before he went back to the post office.

He delivered the last bit for Meadow Lane, crossed back over to the jeep, and unlocked the door. He looked back down the quiet street with its shade trees and its picket fences and laughed at his reaction to it, but his laughter dwindled to a stop and he leaned against the jeep for support when he realized what he was seeing. Or rather, what he wasn't seeing. The new house was no longer there.

He climbed into the jeep and drove slowly down the street, thinking that it

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

must be a trick of the light and shadow, or that it really sat farther back on the lot than he'd supposed, but when he came abreast of where it had been he could see no sign of a house, only the white picket fence dividing the lot neatly between the Fraleys' and the Douglasses' gardens. Without further thought he flipped a U-turn in the middle of the street and headed for the park.

Ted Songerman was late, too. He was pulling the empty mail trays out of his jeep and stacking them on a cart when Greg pulled into the garage at the end of the day. Ted was the rotating shift person, the one who covered a route when the normal carrier was on his day off. He never had time to really get used to a route, so he was always a little later getting back in. He grinned as Greg got out and began stacking his own trays, and said, "You look like a Pony Express rider after the Indians got him. Rough one, huh?"

"Yeah," Greg admitted.

"Feel like knocking back a couple on the way home?"

Greg looked up, surprised. He hardly ever went out for a drink after work, and never with Ted. He and Ted had never gotten along well. Ted was the sort of person who thought that practical jokes were funny, and Greg was not. Greg usually just avoided him, but a frosty mug of beer suddenly sounded like the best idea he'd heard all day. He nodded. "Sure. Let's do it."

They picked up another couple of carriers by quitting time: enough to fill a table at the Silver Dollar. As Ted poured the first round, Sue Windermere asked, "So what's the occasion, Greg? I haven't seen you out drinking since you got promoted to carrier."

Greg shook his head and said, "Just a long day."

Dennis Cook laughed. "I didn't think you *had* long days. That's Ted's job."

"Yeah, laugh all you want," Ted said. "You guys all did the rotating route once too."

Greg took a long pull at his beer. It was exactly as good as he'd hoped it would be. He nodded and said, "And I'm damned glad I'm off it. It used to drive me nuts, having people staring at me from behind the curtains every day. It's bad enough when you're on time, but when you're late it's like the whole neighborhood gets cranked up with about a megawatt of anticipation. I feel like a bug under a microscope."

Sue nodded. "I know what you mean. I feel it too."

"Me too," Dennis said. "That what happened to you today?"

Greg nodded. "Yeah. Got so bad I actually started hallucinating."

"Hallucinating? How?"

"I had a letter for a nonexistent address, and when I got to where it would have been, I saw the house."

"You're kidding," Ted said. "What'd you do?"

"I delivered the letter."

Sue and Dennis erupted in laughter. Ted slowly turned red, realizing he'd been had. Greg realized what he'd done, and tried to squelch it before Ted could start scheming a joke to play in return. "No," he said. "Really, I did. I thought there was a house there. I put the letter in the mailbox and everything. And then when I got to the jeep and looked back, it was gone."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Sue laughed again. "It was a trailer house, right?"

Ted lifted his glass and eyed Greg over the rim.

"I once delivered a letter to a manhole," Dennis said. "There was a crew working on a water line or something, and they'd been there for like a month, blocking this guy's driveway every day, so as kind of a hint that maybe they ought to get moving he sent them a 'get well soon' card, and . . ."

Greg drove down Meadow Lane on the way home, but the house was still not there. *I delivered a letter to a nonexistent address*, he thought, and the sudden absurdity of the whole situation made him laugh out loud. They hadn't believed him in the bar, and now he was beginning to doubt it himself. He'd probably dropped the letter in the Fraleys' box and imagined the whole thing when he'd had that dizzy spell there at the gate. Must have been the ham he'd had on his sandwich for lunch; it was probably spoiled and that's what gave him the shakes and everything else. Just a touch of food poisoning. Yeah. The letter probably *was* for someone staying with the Fraleys, and if it wasn't then they'd just put it back in the box so there was no problem there, either. Forget it.

The next day he had enough to keep his mind occupied anyway. It was Wednesday, *Buyers' Guide* day, which meant a stop at every house on the route. And on top of that he had a box of ladybugs to deliver and the box had a hole in it that he hadn't discovered right away. He'd taped it up, but not before a couple hundred of them had gotten loose in his jeep. Now he was seeing bright orange spots wherever he looked.

He was so busy with the *Buyers' Guide* and the ladybugs that he didn't even notice the shadowy shapes behind the curtains today, and he didn't feel the prickling at the back of his neck until just before he turned onto Meadow Lane. Even when it came it was more of an isolated event, a wave of sensation that passed over him and was gone almost as soon as he noticed it. He rounded the corner and parked the jeep, looking surreptitiously down the block for the phantom house, but he saw only the shady walk and soft pastel houses that had always been there.

He set off down the odd side of the street with a feeling of relief, glancing casually across when he came abreast of the spot where yesterday he had thought he had seen a house, but today there were two vegetable gardens back-to-back against the dividing fence. A rain-bird sprinkler clicked its way around in a circle, watering them both. *Definitely the ham sandwich,* he thought, putting it out of his mind completely.

But back at the post office he learned that the story had gotten around. For a change Ted had had a fast day, and to get back at him for suckering him in the bar, he'd evidently been telling everybody else Greg's story, complete with Greg's assurance that it was true. As Greg parked his jeep and started unloading trays Ted called out from the door, "Hey Greg, see anymore disappearing houses today?"

Heads turned, faces smiled. Ted grinned, *gotcha*. "Here, maybe this will help," he said, holding out a scroll of paper tied with a ribbon. Greg took it

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

reluctantly and opened it. It was a street map with his route marked in orange. Ted said, "The postmaster says anything that's not on the map, you don't have to deliver to it."

Greg forced a smile. "Thanks, Ted. I appreciate it." He made a show of putting it in his jeep's glove box, then finished unloading his jeep, mistakenly assuming that the joke would die out faster if he didn't let it get to him.

But Thursday there was a package for Iptch Tswana, 1014 Meadow Lane. It was just a plain brown paper rectangle about the size of a video tape, not insured or anything. At first Greg thought that it was probably another of Ted's little digs, but the return address was from someone or something called PBW, Newark, New Jersey, and the postmark was real. Ted might have gone to the trouble to arrange a mail drop for a particularly good joke, but he hadn't had enough time for this one. So, it was real.

PBW—Plain Brown Wrapper, Greg thought with a grin. He had seen a million packages just like it, from a million different innocuous-sounding companies. It used to be magazines in manila envelopes, but more and more lately it was becoming video tapes. You never knew who was going to start getting them. There was that preacher over on . . .

But that was none of Greg's business. So the Fraleys' foreign student wanted to check out American porn, what difference did it make to him? None at all. But he'd better tell the kid to correct his address. That *was* Greg's business.

He was still chasing ladybugs out of his jeep today, but the mail was mercifully light, light enough that he was a half-hour earlier than usual when he turned the corner at Eleventh and Meadow Lane. All the same he felt that same wave of sensation that he had felt yesterday, that tingling at the back of the neck like someone was watching him, but today it didn't go away like it had yesterday. It was just like it had been Tuesday, as if there was a physical presence in his mind, someone watching him from within instead of from behind the curtain.

Reluctantly, he looked down the street. The blue pre-fab house was there again, just as it had been on Tuesday. And from this distance it seemed to shimmer slightly, as if heat waves off the pavement were blurring it. But Meadow Lane was a shady street.

And what's more, that house had definitely not been there yesterday.

Greg took the package for Ipswitch Whoever out of the back of the jeep and juggled it in his hand, trying to decide what to do. He felt a moment of absolute blankness wherein no ideas surfaced, then with a shrug he stuck the package in his bag and checked for others on this relay. The address said 1014 and there was a house with the number 1014 on it, so there was at least one thing he could do. He could deliver the mail.

The feeling of being watched faded out about the middle of the 700 block. It was a distinct absence down here three blocks from the mysterious disappearing house, but as soon as he crossed the street and started back toward it the sensation began to return, until when he got about a block away it was back to full hair-raising strength. He walked on to-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ward it, practically oblivious to the other houses, relying on force of habit to deliver the mail while he wrestled with his fear.

The cottonwoods were closing in on him. Tenth Street became some kind of symbolic barrier that he crossed by strength of character as much as by power of legs and feet. He was barely aware of stopping at 1002 and putting their outgoing mail in his bag, leaving a magazine and a sweepstakes notice in the box, walking down the walk, up to 1006's gate where Ginger waited with bared fangs and—

"Yeow!" He slammed the gate in the dog's face and backed slowly away, fumbling for his can of Mace while Ginger clawed at the fence and barked in mindless fury. But it looked like the dog wasn't going to come over it after him. He took a deep breath, wondering why the stupid dog had chosen today to go berserk, then suddenly realized what it was: it had sensed his fear. Not of the dog, but of the blue house, but that didn't matter. Fear was fear in Ginger's tiny but expanding brain.

"Bad dog," Greg said in what he hoped was an authoritative voice and not the squeak it sounded like to him. "Calm down. Nice Ginger." He risked a glance over at the blue house—it was still there—then turned his full attention to Ginger.

"Pipe down!"

The doberman stopped barking, looked up at him with its head tilted to the side, then wagged its stump of a tail. From behind the screen door came a voice saying "Ginger, go to your place," and the dog obediently trotted over to a patch of bare dirt worn in the lawn and lay down. A few seconds later Mrs. Feigelman pushed open the screen and said with a shake of her head, "Don't mind him; he won't bite. He's just a big softie, aren't you, Ginger?"

The dog wagged its stump of a tail again and *whuffed* softly at her.

"Any mail today?"

"Uh, yeah." A little shudder ran down Greg's spine as he stepped through the gate again, extending two letters out to her. He was turning to go when she said, "Whoops, this one's for Fraleys."

He took it back and looked at the address. "So it is. Thanks."

"You're welcome. I guess Ginger's little joke must have rattled you a little, huh?"

Joke. Right. "Yeah," Greg said. "I guess so." He turned away again and made it through the gate, then turned back again.

"Yes?" Mrs. Feigelman asked.

"Can you—" *see a blue house two doors down?* he wanted to ask, but he suddenly realized that if she couldn't then she'd think he was more than just a little rattled. "—maybe keep an eye on him around this time of day?" he finished lamely. "I don't think he likes me much."

"Oh, he likes everybody. But I'll watch him."

"Thanks." Greg turned and walked on toward 1012, Ginger already forgotten.

He delivered Fraleys' letter without taking his eye off the blue house. It was sitting square over the top of the garden he had seen yesterday. For a moment he thought he could still see stalks of corn too, as if one eye saw the garden while the other saw the house, but when

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

he blinked the garden was gone. He hesitated at the Fraleys' mailbox, wondering if he should ring the doorbell and ask if they had a foreign student staying with them, but he knew they didn't. Iptsch Tswana lived right there, wherever there was.

He took the package out of his bag and advanced on the house. The feeling of being watched was back as strong as ever. He knew there was someone inside, and now he seemed to be getting some kind of sixth-sense feeling about them in return. Just as Ginger had sensed it in him, he felt fear emanating from inside the house.

They're afraid of *me?* he thought, barely stifling a hysterical laugh. *What am I going to do, report them to the postmaster?* He sensed a sudden surge of fear from inside at that thought, fading slowly as he shook his head. The postmaster wouldn't believe a word of it, and he'd be lucky if he got off without a psychiatric exam. Especially with Ted's joke circulating around. Mail carriers had cracked before.

Not a reassuring thought. Well, he wasn't going to crack; he was going to find out what the hell was going on here. He put his hand out to push open the gate, remembered the shock from the time before, and pushed it open anyway. He got shocked again, but it was no worse than an ordinary static shock, of about the magnitude you'd get scuffing four or five times across a new carpet and then touching a light switch. To get shocked by a picket fence was definitely strange, but it was in keeping with the rest of the place.

He marched up to the door, ignoring the mailbox, and pushed the bell button, but if it rang anything inside he couldn't hear it. He knocked on the door frame and, clearing his throat, said through the screen, "Hello, is anybody home?"

No answer, but he still got that feeling of being watched, still felt the sensation of fear.

"Package for—" he looked at the package "—Iptwitch Tiswana," he said, beginning to feel a little foolish. After all, the damn thing would fit easily in the box.

The sudden wave of—what? Hope?—that washed over him was even stronger than the fear. It was almost as if someone had spoken to him, saying, "Yes, put it in the box!"

You are reading my mind, aren't you? he thought.

The sensation cut off abruptly. No fear, no hope, nothing.

"Hello," he called again.

Nothing.

With a shrug, he opened the lid and dropped the package in the box, turned, and walked back down to the gate. On sudden impulse he swung the mail bag over and used it to pull the gate open, stepped through, and pulled it closed behind him with the bag. But when the latch clicked, he still felt a shock.

He looked up, but the house was gone. In its place stood Mr. Douglass, his back turned to Greg, calmly watering his garden with a hose sprayer.

Greg took a deep breath, let it out, then nodded. Okay. He'd just delivered a pornographic video tape to a corn patch. He reached in his bag and pulled out a *Prevention* magazine and a *Reader's Digest,* then shouted, "Good afternoon!"

Mr. Douglass's start sent out a wave

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

in the water stream, then he turned and squinted at Greg. "Afternoon," he admitted.

"Got your mail here," Greg, said, holding out the magazines.

The old man nodded, twisted the valve on the sprayer until it stopped and set it down, then walked over to the fence.

"No bills, I hope," he said with a smile that revealed a missing front tooth.

"Not a one," Greg said, handing the magazines across the fence.

"Think it'll rain?"

Greg looked up at the canopy of leaves overhead. "Not under here."

"Never does."

"I don't suppose." Greg cleared his throat. "I, uh, was wondering, did there used to be a house here before yours? Right in the middle here?" He waved at the two gardens on either side of the fence.

Mr. Douglass shook his head. "Nope. This here was all sagebrush when we built on it. Why?"

"I just—well, for a second there I thought I saw something. Like a ghost house. Must have been a trick of the light."

The old man turned to look at the gardens, then back at Greg, who was blushing by now. He laughed. "Must've been. Any ghost house you'd see out here'd just about have to be a teepee."

"That's what I thought. You, uh, you didn't see anything just now, did you? Flickering at the corner of your eyes, maybe?"

"You get my age, son, everything flickers. But no, I didn't see nothing diff'rent, if that's what you mean."

"Must've just been my contact lenses, then," Greg said. "Every now and then they do that."

"That so?"

"Yeah, seems like you never get used to them." Greg rubbed at his left eye and started to walk on down the street. "Thanks," he said in parting.

He could feel eyes on him as he walked on past the Douglass's house, but this time he knew whose they were. *Boy, that was stupid,* he thought. *Now Douglass thinks you're a kook too.*

And maybe he was right, hmm? Ghost houses, and people who read minds! Maybe he should call the *National Enquirer* and have them come do a story on him.

He made it back to his jeep without seeing any more disappearing houses and drove up Eleventh to Willow Lane, where he loaded his bag again for his next relay. As he walked from house to house he thought about what had just happened to him, and decided that he was not crazy. There had been a letter on Tuesday, and a package today, and both of them had gone *somewhere*. Where? Wherever the house at 1014 had gone when they blipped it out of Douglass's corn patch.

And that shock; it wasn't electricity he was feeling, not from a wooden fence that he hadn't even been touching that last time. It was more likely the momentary disorientation of matter transmission when they blipped *him* wherever *they* were all along. They certainly weren't really in the corn patch.

And then there was that mind-reading bit. Purely subjective, that, so not reliable as evidence, but it was something to remember.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

All right, suppose the gate was a Gate, a doorway into someplace else. Somebody on the other side obviously needed something from this side, and they were getting it by mail. Why? Because they couldn't let themselves be seen here. Why not? Because they had green skin and tentacles instead of arms? And they liked human pornography?

It started to fall apart about there. Greg thought about it a while more while he walked down to Eighth Street and back again along Willow Lane, and he finally came up with a flaw in his reasoning. He didn't know for sure that the package held a porno tape, or even a video tape for that matter. It could be anything: books, Swiss chocolate, or repair parts for a nuclear reactor. It was *something*, and that was what was important.

The admission that the package and the house were real brought a little sanity back into the situation. Not much, but it made the difference between admitting he was crazy and trying to prove that he was not.

The next day there was no letter, and no blue house on Meadow Lane. The watching sensation hit him while he was still on Aspen, a block away, and faded out again in a few seconds, but that was the only bit of strangeness that whole day. *They were just checking*, Greg thought. *They read minds; so they know when there's no mail and they don't have to open the gateway for me.*

Saturday Ted drove the route. Friday afternoon he made a big thing of asking Greg where the disappearing house was, but Greg just shrugged it off and let him go on about it until he'd run himself down. There was no delivery on Sunday. When he got to work Monday Greg resisted the urge to ask Ted if he'd had a package for 1014, but he was almost glad to see another videotape-sized package waiting for him today. He'd been thinking about it over the weekend, and he'd come up with an idea.

When he felt the first glimmerings of someone watching him he concentrated on keeping a clear image of the package in his mind. Nothing else but the package, don't give them a clue to what else you're carrying . . .

The presence in his mind settled down to a steady Watchfulness. Greg ignored it as best he could, delivering the mail as he always had when it was just people watching him. He turned the corner onto Meadow Lane and glanced quickly down at the blue house—yes, there it was, shimmering slightly—then pointedly ignored it and delivered the mail all the way down the odd side to Ninth Street, then back up the even side. Ginger stayed in his place, and Greg smiled. *No fear this time.*

He paused at the Gate, reached in his bag for the package, and held it before him like an offering while he pushed his way through. He was ready for the shock; as soon as he felt it he turned around and looked back at the street. Yes, it was definitely shimmering out *there* now.

Keeping his mind firmly on the package, he walked up the walk, put the package in the box, and walked back down to the Gate. But instead of going through, he reached into his bag again and took out the pocket Instamatic camera he'd tucked into it this morning and one-handedly fired off the whole roll of

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

film in a shaky panorama, making sure he got some of the neighboring houses in the picture along with the blue one. Then he tucked the camera back in the bag, took out the compass, noted the direction of magnetic north and the direction of the sun in relation to the other houses, and put that back in the bag too. *Then* he stepped through the Gate.

It took fifteen seconds, maximum. He'd practiced with an empty camera until he'd gotten it down. Now, as he walked purposefully down the sidewalk away from the Gate, he felt a rush of alarm in his mind, a rush that suddenly blinked out of existence along with the house.

He couldn't help grinning as he worked his way back to the jeep. Score one for curious mailmen! There was one customer who wouldn't be calling the postmaster to complain.

Back in the jeep he took out the compass again, and sure enough, local North at the house was at least sixty degrees west of true. That put the sun, which had appeared an hour or two lower than normal, in the northern sky, which put the house somewhere in the southern hemisphere.

Assuming, of course, that it was still on Earth.

Aha! Tomorrow he would bring a spring scale and measure the local gravity. And maybe a bottle for an air sample? Who could he get to analyze it for him?

Or would he get the chance? He might have scared them off with the camera and the compass. He had thought about it last night while he was practicing with the camera, but somehow it didn't seem likely that they would scare that easily. They were more afraid of scaring *him*. They needed whatever he was delivering, needed it bad enough to come up with this whole business of the house, and as long as they could read his mind and know that he hadn't told anyone else about them, they wouldn't do anything to jeopardize their supply.

What *was* he delivering to them? He had thought about just opening the next package and finding out—for about half a second before he realized what he was considering. Opening people's mail was just about the worst thing a carrier could do. Start doing that and you might as well just quit the job; you wouldn't have it much longer anyway. Taking pictures of someone's house was bad enough.

Feeling somewhat guilty, but not guilty enough to throw out the film, he made a detour past the one-hour fast photo shop and dropped it off before he went on with the rest of the route.

He half expected to find that his film had been mysteriously fogged, or that he would have a dozen shots of Meadow Lane, the Fraleys' house, the Douglasses' house, and a corn patch; but what he got back from the photo shop was exactly what he had seen while he was taking the pictures. So, here was physical evidence that something out of the ordinary was going on. He thought momentarily about showing the photos to Ted, but he knew that was the wrong approach the moment he thought of it. Let Ted know that he was getting under his skin and he'd never let up. The photos would just make it worse.

Part of him said *look, here's proof that you're not nuts, so just leave it alone and deliver the mail*, but another

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

part of him said *not yet*. He was still too curious.

He waited four days for another package. The anticipation was getting to him; he didn't sleep well, and he was distracted at work. Ted took advantage of the opportunity, rolling his eyes and making spirals beside his head with his finger when he thought Greg wasn't looking, but Greg ignored him. He knew he was doing too good a job, that he was driving Ted to do something truly bizzare just to get a reaction, but he didn't care. He had something bigger than Ted on his mind.

Each day he felt the probe of inquiry as he neared Meadow Lane, and each day he concentrated on the image of a package, but not until he actually had the real item with him did the house reappear. They could tell when he was faking it.

He tried knocking on the door again when he delivered it, but still nobody answered. So with a shrug he reached into his mail bag right there on the porch and took out a fisherman's scale with a ten pound weight hooked to it.

At least it had been a ten pound weight that morning. Now it was about eight and three-quarters. Not a big difference, not enough to notice in the soles of the feet, but measurable.

And suddenly, standing there with the scale dangling from his hand, Greg's composure cracked. There wasn't anyplace in the solar system with nine-tenths of a gravity and a breathable atmosphere. Wherever they had brought him to, it was a *long* ways away. He stuffed the scale back in his bag, jammed the package into the mailbox, and rushed back through the Gate to Earth.

He staggered diagonally across the street to his jeep, fumbled with the key to unlock it, and collapsed inside. Heart racing and breath coming in short gasps, he sat in the seat and tried to get control of himself again, and after a few minutes he was able to sit up and take a few deep breaths. He looked back down the street to where the blue house was no longer visible. He wanted to go back to the post office, tell them that he was sick and to get somebody else to finish the route. Nobody should have to deliver mail after being yanked halfway across the universe and back. But he knew if he did that he would call in sick in the morning too, and the day after, and when he had used up his sick time and all of his vacation time he would go for early retirement rather than face that house again.

And Ted, damn him, Ted would be right.

No, he had too many years invested in this job to give it up now, strange house or no. He took another couple of deep breaths, got back out of the jeep, and finished the even side of the street.

There was no package for 1014 on Friday. Even so, as he made his deliveries Greg tried to reconcile himself to the truth: he had an alien house on his route. He tried again and again to tell himself that it was none of his business who they were, but nobody—not even the most unimaginative mailman in the world—could go on delivering to that address without some kind of explanation. Postal Creed be damned; that was beyond the call of duty.

If only they would talk to him! All he wanted was an explanation. If they

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

would just talk to him once, tell him what was going on and why, he could deliver their mail until he retired. But how could he get them to talk? He thought briefly about just opening the door and walking in on them, but that seemed a little reckless. After all, his theories about them were just wild speculation; they could be anybody, or anything. He remembered a cartoon he had once seen tacked up on the bulletin board at the post office: a predatory life form disguised as a mailbox, flag up to attract mailmen.

No, just barging in on them wouldn't do. What he needed was some sort of remote sensing device, some way to tell if they were friendly *before* he risked his skin trying to talk with them. He needed to bug them.

He tried to imagine how to do that. He had a couple of days to figure it out; his weekend was coming up. Ted would be driving the route tomorrow, and—wait a minute.

Something clicked in his mind. Yeah. It worked for the court house, why not for him?

The next morning Ted left the post office with a certified letter in his bag and a puzzled frown on his face. Greg, following him slowly a few blocks behind, was sure that his expression would change before the day was out. Oh yes, it would change. ■

ON GAMING

(continued from page 109)

There are eight missions provided ranging from a training exercise in the friendly Caribbean to all out battles with Soviet corvettes in the Gulf of Sidhra.

Special features include a time compression mode that allows the actions to take place at 128 × normal speed and total control of search helicopters and convoy ships.

Besides including clear instructions, the manual comes with cardboard cutouts displaying allied and enemy vessels, "friend or foe" pictures that recall World War II gum cards. There's also an essay by Colonel Vernon Salisbury, a PHM Commander and Chief of Boeings' PHM Test Group, giving a history of the hydrofoil and Congress's on-again, off-again support for the project.

The game is easily played, though mastering maneuvering, aiming, and avoiding enemy fire will leave you, most often, in a sunken PHM. The scenarios grow in complexity ranging from a search and destroy mission against terrorists to a daring rescue of a supply ship fleeing a war zone.

An exciting, intense game, *PHM Pegasus* brings the navy's latest technology to life in a "gee whiz" mood that recalls a simpler world, from many years ago. ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The Alternate View

THE SELLING OF PROTON

G. Harry Stine

I don't often devote this column to space because a lot of science and technology is waiting to be written about. But some occurrences have taken place which were not reported—aye, even denied—and that riled me so deeply that I believe you should know about them.

You can tell that a business is really in trouble when it starts buying products and services from its arch competitor, filing off the serial numbers, then denying that it's done it. When this occurs—and it often does in the business world—it is always done by quiet, almost secret agreement. Neither company really wants it known that the other is using the competition's product/services.

It has also been said by American business journalist Malcolm Forbes, "Never underestimate the American response to a business challenge." Okay, folks, we're going to see whether that statement is true in the next few years.

The United States has been challenged again just as it was by the Soviet *Sputnik* thirty years ago. *Sputnik* was a prestige and therefore a national security challenge, and the U.S. government responded. This time, the Soviets have challenged us in the economic and business area, and it's going to be up to the business and financial interests to respond because now we're talking about cold, hard money and the loss of business. It's not a national security issue, so don't believe for an instant that the U.S. government will respond.

On July 16, 1965, the Soviets launched a big rocket carrying a satellite they called *Proton*. Thus, western space observers have called this rocket the *Proton* ever since, although the rocket has launched many different sorts of satellites, deep space probes, planetary probes, and the Salyut space stations. The late Charles Sheldon of the Library of Congress designated it as the "Type D" launch vehicle under his nomenclature system. The most recent western designation of the original *Proton* is SL-9.

We knew the *Proton* was a big launch vehicle; the *Proton 1* satellite weighed 26,869 pounds. In typical Soviet fashion, the *Proton* was kept as a big state secret until recently.

I made some educated guesses about the appearance and performance of *Proton* in my article, "The Big Boosters of the USSR," published in the September 1969 issue of this magazine. I calculated a gross weight of 1,523,000 pounds, a base diameter of 33 feet, and a lift-off thrust of 2,500,000 pounds. *Proton* was obviously in the Saturn-Ib (the "little" Saturn) class. I wasn't too badly wrong, as we'll see.

The Soviets kept improving *Proton* with better upper stages. This produced the SL-12 and SL-13 versions of *Proton* for launching spacecraft to escape velocities and to loft the Soviet Salyut space stations respectively.

Typically, the Soviets would occasionally release a photo showing only

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the top part of the booster, but never the whole vehicle.

In the December 1973 issue of the magazine *Spaceflight* published by the British Interplanetary Society, Charles P. Vick presented his analysis of the *Proton* along with preliminary drawings. Time would show these to be remarkably accurate.

The first photos of the complete *Proton* vehicle were released by the Soviets in December 1984 when a *Proton* launched the Vega 1 probe to Halley's Comet. Beautiful color photos plus a detailed brochure were available at the meeting of the International Astronautical Federation in Budapest in October 1986.

Charles Vick and I were close. *Proton* stands 142 feet high with a base diameter of 23 feet. Its lift-off thrust comes from six RD-213 rocket engines clustered to produce 2,022,500 pounds of thrust. *Proton* will lift 44,000 pounds to Low Earth Orbit (LEO) and 4,400 pounds to geosynchronous orbit (GEO).

Vick originally postulated six first-stage strap-on boosters, each with a single RD-213 and a core with two RD-213s. It became obvious from both the launch videotapes and the color photos that the *Proton* didn't utilize strap-on boosters at all. It was indeed very much like the NASA Saturn-Ib. The "strap-on boosters" turned out to be six external tanks carrying unsymmetrical dimethyhydrazine fuel while the central core tank carried nitrogen tetroxide oxidizer.

We now know that the Proton was one of the two vehicles involved in the for-real Soviet manned lunar landing program canceled in December 1968 when it became obvious to the Soviets that they couldn't beat the U.S.A. to the Moon. (This was announced in Moscow and reported in the *New York Times*.) The Soviet Saturn-class heavy lifter, the so-called Type G launch vehicle, never made the grade; the first one blew up on the pad on July 4, 1969 and the next two blew up in the air; that project was canceled in 1973 when it became obvious that the many problems with this huge booster couldn't be solved.

In an article, "Some Strange Things Happened at Baykonyr," published in the October 1970 issue of *Analog*, I reported that the ill-fated *Soyuz-1* had been launched by the *Proton*. Every Soviet space watcher in the west laughed at that because later photos showed the *Soyuz* being launched by the old, reliable SL-4 *Voskhod* vehicle. But I maintained that the original *Soyuz* wasn't a mere 14,000 pounds but had weighed nearly 35,000 pounds. I now have a drawing from a Soviet book showing the "heavy *Soyuz*" and even Charles Vick says I was probably right. The circumlunar *Soyuz*, called "Zond" when it flew unmanned, was launched by a Proton and *had* to weigh that much to support a single cosmonaut on a circumlunar flight. But once their lunar program had been canceled, there was no requirement to solve the man-rating problems of the *Proton* which had basically caused the failure of Soyuz-1, so the Soviets never did man-rate the vehicle. This is because the *Proton* is probably a very "noisy" vehicle from the vibration standpoint, and there may be some "pogo" problems in it that make it okay for unmanned launches but which would shake up a crew pretty badly.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

We now know what Proton looks like. We know its various payload capabilities. And we know that the Soviets' annual production of *Protons* is twelve vehicles, one per month.

As early as 1985, there were reports from Charles Vick and Arthur Bozlee that both the *Soyuz* and *Proton* launch vehicles would be marketed internationally. In fact, the USSR even established a "civilian space agency" called Glavkosmos SSR, which translates as "The Main Administration for Development and Use of Space Technology for the National Economic and Scientific Research." If you honestly believe that's a civilian space agency, I would like to make you an attractive deal on a bridge . . .

At the 1986 IAF Budapest meeting, American delegates were told privately by Glavkosmos representatives that the USSR would provide launch services on both the SL-4 *Soyuz* and the SL-12 *Proton*.

The SL-4 would be offered for $8 million in Swiss francs and would be able to carry 300 kilograms (660 pounds) to LEO. When an American remarked that the payload capability seemed a bit low for a *Soyuz* vehicle, he was told, "Not if you include two astronauts." In short, the Soviets were willing to sell a two-man space launch vehicle for $8 million!

Glavkosmos also offered the *Proton* for $40 million in Swiss francs, $100,000 deposit, launch within 18 months from Baikonyr, and total customer security for the payload.

On January 10, 1987, Glavkosmos got a customer: Intelsat, the world communication satellite consortium headquartered in L'Enfant Plaza only about a mile from the White House in Washington.

Intelsat signed a letter of agreement with Glavkosmos to launch the new Intelsat 6 series of comsats starting in 1989. The reason given for Intelsat's action: Lack of western launch capability. In short, the U.S.A. doesn't have the space launch vehicles capable of putting 4,400 pounds into geosynchronous orbit and will not have that capability for commercial space interests until 1990 or beyond.

Hughes, builder of the Intelsat satellites, vehemently denies that a "contract" exists. Intelsat is curiously evasive. A contract probably doesn't exist at this moment, but a letter of agreement apparently does. I got the information independently from three separate and highly reliable sources. Aerospace cognoscenti are saying, "No, no, Intelsat is dealing for Titan 4 launch vehicles for the Intelsat 6 series." This is true and one would expect Intelsat to hedge its options during these times of space launch crisis.

It wasn't very upsetting when many American commercial satellite companies went to the European Arianespace organization to get their satellites launched on the Ariane booster; after all, that's a western rocket and we all deal in the same hard currency, even at $80 million per launch.

(The Japanese have the capability to launch satellites, but they are currently prevented from offering international launch services because of restrictions in their licensing agreement with an American aerospace company whose launch vehicle they're building in Japan;

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

that will change in 1990 or thereabouts when the new Japanese launch vehicle becomes available *without* those restraints. If you think Nissan, Toyota, Suzuki, Honda, Sony, Yashica, and other Japanese firms caused a lot of heartburn in corporate America, wait until the Japanese get into the space business, too!)

But it should cause an enormous stir when *an international consortium based in the United States agrees to pay $40 million in hard currency to launch an American-built satellite on a Soviet rocket* because the United States does not have the space launching capability!

This hasn't caused a ripple.

Because you haven't known until now that it's taking place.

You will undoubtedly see one of two reactions to this column: (a) it will be ignored, or (b) it will be denied with a condescending criticism that "Mister Stine does not have his facts straight." But I trust my sources.

The sort of reaction I would like to see is a business and financial response comparable to the U.S. government's response to *Sputnik*.

It is time to stop talking, planning, dreaming, and beating ourselves about the head and shoulders.

It is time to reach up on the shelf, take existing technology, start cutting metal, and bend tin to make rockets! The money to do this is available; more about this in a future and longer article.

Soviet helicopter designer Mikhail Mil gives good advice to his engineers: "Make it simple. Make it reliable. Make it rugged. Make it *work*."

We ought to be able to do that, too. And we ought to be able to get the money from private investment sources because that hard currency may be going to go to the Soviet Union if we don't.■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

the reference library

By Tom Easton

Becoming Alien, Rebecca Ore, TOR, $3.50, 320 pp.
Arslan, M. J. Engh, Arbor House, $16.95, 274 pp.
The Uplift War, David Brin, Phantasia Press (5336 Crispin Way, West Bloomfield, MI 48033), $22.00, 506 pp.; Bantam, $4.50, 672 pp.
Vacuum Flowers, Michael Swanwick, Arbor House, $15.95, 248 pp.
The Grey Horse, R. A. MacAvoy, Bantam, $3.95, 256 pp.
Beyond Humanity, Justin Leiber, TOR, $2.95, 254 pp.
Victim Prime, Robert Scheckley, Signet, $3.50, 224 pp.
Mathenauts: Tales of Mathematical Wonder, Rudy Rucker, ed., Arbor House, $18.95 hb, $8.95 pb, ? pp.
A Fall of Moondust, The Sands of Mars, The Wind from the Sun, and **The Nine Billion Names of God**, Arthur C. Clarke, Signet, $3.50 each.
The Jaguar Hunter, Lucius Shepard, Arkham House (Sauk City, WI 53583), $21.95, xii + 404 pp.

A few months ago I, like Spider, used a little column space to remind writers that if they send manuscripts, the reviews can come out in time to make a (presumed) difference in sales. Result? I have heard from one writer, and I am pleased to announce that her book is so marvelous that I will not be a bit surprised if it wins a Nebula or Hugo, or even both.

It is Rebecca Ore's first novel, **Becoming Alien**, it is a Ben Bova Discovery for TOR Books, and it is a gem. If you let yourself miss it, go shoot yourself.

The tale opens in hillbilly country, where hero Tom is watching his brother Warren sweat through a drug deal. Warren, you see, is a modern moonshiner, synthesizing strange compounds in a cavern dug out beneath the house, and the urban money-men are leaning on him to increase production.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

A spaceship of sorts crashes, and Tom drags from it a single surviving alien. Warren wants to kill it, but Tom prevails, and they nurse it back to health, while Tom dismantles and hides the wreckage. Later, Warren yanks Tom out of high school to help him in the subterranean lab. The alien, with whom Tom is learning to communicate, is also drafted in the interests of productivity.

In due time, Tom and the alien decide to run away. Unfortunately, Warren twigs to their plans, traps them, and shoots the alien. The cops raid the farm, Warren goes mad, Tom becomes an ex-con, and more aliens arrive. They seek the others, including the young cadet, Mica, whom Tom had befriended. And now Tom learns of his legacy: Mica had left a note saying that Tom should go to the alien worlds, alone of his kind, to be trained like Mica for contact and diplomacy missions.

Reluctantly, Mica's kin and seniors agree, and Tom is off, surrounded by the strangest of sentients—blood-sucking bats, medical bears, arrogant birds, and more. He must, somehow, overcome not only the antipathy of Mica's kin for one associated with death, but also his own xenophobia. He must adapt to and become part of a multispecies whole. The alternative—made vivid by a tribe of humans descended from an earlier attempt at assimilation—is redneck savagery.

Do you think that sounds easy enough? Especially for a SF reader? Then think—it is hard enough to join with other humans, whether same or different in color, language, religion, or political philosophy. It is that much harder when the ones with whom you must join are different in what Ore calls their hard-wired responses to the world. Tom's xenophobia—and that of numerous other characters—is written into the genes. One species fears another on a reflexive level because it was once the prey for similar predators. Loners find gregarious species such as the bats disgusting, and vice versa. Food habits repel on the most basic of levels.

Even communication is difficult when minds work in very different ways. But the aliens have met that problem by inventing new languages of enormous subtlety that each individual or species that wishes to join their federation must learn. Failure to learn they define as a failure in an essential component of sentience.

Tom succeeds, of course. Does he, in the process, become alien? I—and Ore, I think—believe he becomes more completely human, but we define humanity mostly in terms of adaptability. Most people don't. As Ore reminds us with her opening set piece, most people define normal humanity in terms very like those of country-and-western music. They will therefore see in Tom's success some ultimate perversion of human nature, becoming alien, indeed. Ore highlights this difference with the Yauntries, a species like humans in many ways, including their hard-wired xenophobia and fondness for guns. Can they be brought around? Can *humans* be brought around?

Ore is optimisitc. She says that, yes, we can adapt to a multispecies civilization. She knows that it will not be easy, and that there will be stumbles along the way, but we can do it. And when we do, we will find a marvelous world awaiting us.

Most marvelous of all, perhaps, Ore delivers her message with very little lecturing. She offers occasional soliloquies to underline her points, but her pedagogy is by and large that of the laboratory, that of demonstration, not that of exhortation.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Can she tell a story? I wouldn't rave like this if she couldn't. Messages are all well and good, but they need something more, which she provides. She has such a gift for characters that even her aliens—some of whom are as alien as anything in SF—evoked my empathy. She also has a gift for plot so great that she can weave a gripping tale without a single space battle (though some of her characters do get killed).

I cannot recommend this one too highly. And I'm looking forward to the sequels Rebecca has promised me.

The other day, Shelley Frier, late of *Analog* and now of Arbor House, called to tell me about **Arslan**, by M. J. Engh. The book, she said, was a paperback original in 1976, but it died immediately, thanks to miserable marketing. It was reviewed only once, but that once was in *The New York Times*, and it was as laudatory as any novelist—novice or not—could ask.

Now, said Shelley, Arbor House was going to reissue the book, in hardback. If that sounds like some bizarre reversal of normal, traditional publishing procedure, well, it is. Hardbacks have been known to come after paperbacks, but *never* eleven years after. Arbor House justifies the reversal by pointing to how sorely neglected *Arslan* was the first time out. It deserves to be, said Shelley, and it will be, treated just as if it were a brand-new story.

What Shelley was describing sounded like an unusual degree of commitment for modern publishing. It made me want to see what she was enthusing about. So, when the book arrived, I read it.

And hot diggety! Stupefying zimzams! What we've got here, folks, is a book that every one of you, and all your friends and relations, should read, if possible immediately after finishing Barry Longyear's *Sea of Glass*.

Why? Consider: Engh shows us a rural midwestern town, Kraftsville, as foreign troops roll in, with the radio announcing that this is with the approval of Washington. The troops are led by Arslan, a Turkistani who has, somehow, taken over every government on Earth.

What is Arslan doing? At first, we see him only as a charismatic leader, joyfully worshiped by his soldiers, taking over the Kraftsville school and the house of the initial viewpoint character, Franklin Bond, the school's principal. Arslan arranges a feast, rapes one girl and one boy student in front of the whole town, kills one schoolteacher, and takes another off to his quarters.

The *Times* said that "Engh's performance is as perversely flawless as Arslan's." And so it is. Her point is to stun us, to shock us out of our "It can't happen here" complacency. So is Arslan's, as he uses the shocks of occupation, rape, curfew, and expropriation, and the threat of annihilation if he dies by any local hand, deliberately to cow the townspeople. Engh underlines it all with Bond, an apparent collaborationist, urging patience and cooperation even as he takes the first small steps toward the Kraft County Resistance.

Yet Arslan is no typical dictator. He seeks not self-aggrandizement, nor power for its own sake, nor wealth. He is a charming fellow, fond of wine, women, and song, but he is also an idealist. He has a plan, to break the world into self-sufficient districts lacking communication, transportation, and industry. Only thus, he says, can the world be saved from overpopulation, pollution, and political insanity. His means, in America, include Russian and Turkistani troops.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

In Russia, American troops obey his deputies.

Before long, the untold plan emerges. Women have stopped having babies, and Arslan confesses to Bond that one of the "vaccinations" he ordered early in his reign has sterilized all human females. The world for which he cares is the world without humans, and it is his ultimate aim to wipe the human species off the face of the Earth. He will do it as kindly as he can, by sterilization rather than mass murder, but do it he will.

This is why I say you should read *Arslan* in conjunction with the Longyear book. Both authors—their differences only suggested in their identities as a northwestern woman and a northeastern man—proclaim the need for drastic solutions to serious problems. Of the two, Engh is by far the bleaker, although toward the end she does offer a rumor of hope for human survival. She may also be the better, for her characters are far more vivid, more rounded, more complete—more alive—than Longyear's and her instruction more poignant, more pointedly targeted on the human heart. And Longyear is himself more vivid and poignant than most.

Arbor House properly bills *Arslan* as "political SF" but it errs, I think, in comparing it to *Brave New World* and *1984*. Like those books, *Arslan* is a cautionary tale, but it is neither satirical nor dystopian. *Arslan*'s point is ecological and its mode is prescriptive, and even utopian. In fact, many of Engh's characters find their new conditions of life more satisfying than the old. They have been raped, and they have learned to love their rapist.

Now, before you start writing nasty letters, let me say that I do not even begin to believe that every woman (or man) secretly yearns to be raped, or that rape victims eventually do come around to seeing the rape as a positive experience. The latter is *Engh*'s statement, though she embroiders it with plenty of anguish and ambivalence.

Nor do I agree that we must dismantle every scrap of government and technology in order to save the world. I *do* agree that the world's problems of population and resource supply and distribution and environmental degradation and political madness are so serious that they require drastic solutions. Anything less has no real hope of doing any good.

Perhaps David Brin would agree. In **The Uplift War**, he makes passing reference to Earth's age of madness—*our* age—and how only the discovery of sanity made it possible to survive. A drastic solution, indeed—redesigning the human psyche for reasonableness and stability—and underlined by the contrast in the novel with the lower ranks, the Probationers, of the genetically engineered or uplifted chimpanzees that dominate much of the story.

Is that the point? *The Uplift War* shows us some of the consequences of the discovery that made *Startide Rising* exciting. The respectable species of the Uplift culture, only a few of which are on the side of wolfling humanity, unuplifted, itself uplifting Earth's chimps and dolphins and thereby breaking every hallowed tradition in sight, are in turmoil. Some of the most anti-human pursue the *Streaker*, the dolphin ship that has discovered what may be the abandoned ships of the Progenitors, who eons ago uplifted the first of the galaxy's sentients. But that is background. In the foreground, another enemy species mounts an attack on Earth's colony world of Garth, where humans and chimps together are rebuilding a biosphere nearly wrecked by past colonists.

LICENSED TO UNLESS.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Yes, it is. The invading, birdlike Gubru act like children who have been taught that tantrums are the way to greatness. Brin has given them an intriguing sociobiology, one that might make such immaturity a brief phase in the history of an intelligent species, but he does not let that inhibit his object lesson. They, and most of the other aliens, suffer from the supreme sins of hubris and humorlessness. *They*—not humans—were uplifted. They were given the universe, and they recognize in it no place for upstarts who have not come along through the proper apprenticeship program.

The point gains strength with Brin's use of the neochimps, some of whom are as noble as any of the humans. They have their atavistic twitches but, says Brin, it does not matter whether one makes primitive noises or scratches in public. What matters is stability and reasonableness—and a sense of humor, precisely what the neochimp Probationers, the Gubru, the human obstructionists, and present-day human politicians lack most of all.

He's serious, folks. And just in case you're inclined to miss the point, he makes the only alien good guys the Tymbrimi, renowned for their love of practical jokes. What's more, humans and neochimps and Tymbrimi together defeat the Gubru and score massive points in the Uplift culture with the aid of one of the grandest jokes in galactic history. And if the alien who joins with the Tymbrimi on the side of the angels strikes us as pretty dour, he is nearly an outcast from his own kind because of his relative puckishness.

I am enjoying Brin's Uplift series. He handles the basic concept well, developing its ramifications beautifully and supporting them with some very satisfying plots, characters, and sheer storytelling. And the concept itself—there is no such thing as Ancient Astronauts, *for humans*. For the Ancient Astronauts themselves, however, it is another story. It is a masterfully humorous inversion of popular mythology, so worthy of the Tymbrimi that Brin must have intended them as a self-portrait. (Or does he have a relative named Tim? If so, Tim Brin, he must be an even funnier fellow.)

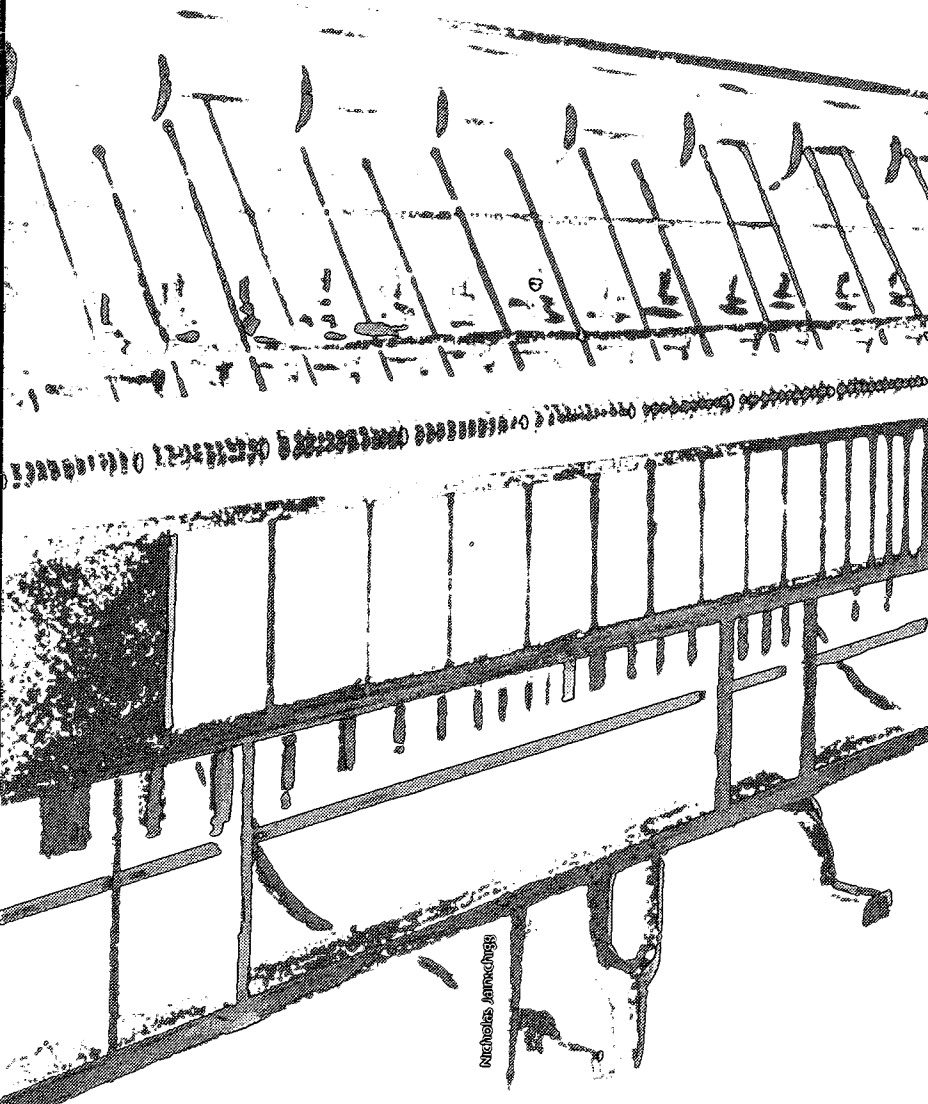
With **Vacuum Flowers**, Michael Swanwick stakes his claim on the cyberpunk territory by stepping past it. He shows the same perfervid imagination as Gibson *et al.*, hurling at the reader an endless stream of novelties. He has as gritty a grasp on reality. But he tells us that the computer-human symbiosis has proven stagnant: When humans first stepped into Gibsonian cyberspace, they birthed a synergistic entity that promptly absorbed every computer and human on Earth to form the Comprise. Then it tried to leap into space and take over that portion of our species that dwelled in the orbiting habitats and beyond. However, the delays imposed on communication by distance shattered the psychic unity of the Comprise's soldiers. The hive mind that was Earth fell back from space. The remaining independent humans could stay free, as long as they had the sense to stay away from cyberspace.

Yet Swanwick's independent humans still crave software-mediated new states of consciousness. Avoiding the machine, they develop "wetware," by which they can program skills and personalities into individual brains. Swanwick doesn't describe the technology, except in mumbo-jumbo terms, but that suffices—any serious attempt at description (even as simplified as Effin-

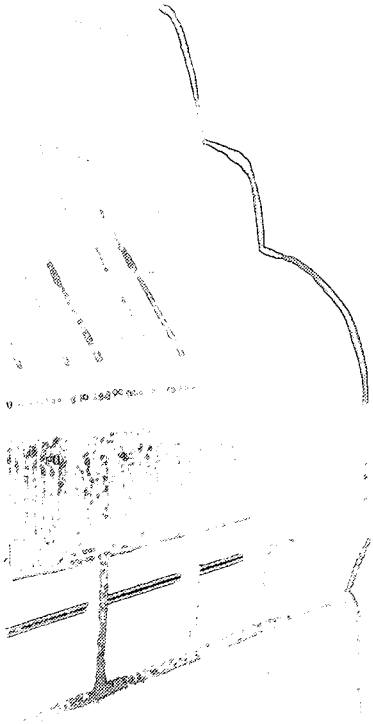
Continued on page 183

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

There are certain things that almost everybody thinks shouldn't be done—in the abstract. Yet everyone does them, in reality—and when you learn to do them better, you have to decide what to do with that ability.



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



IN THE COUNTRY OF THE BLIND

Michael F. Flynn

Conclusion

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

It is 1864. **Brady Quinn** *and his mentor* **Isaac Shelton** *are on their way to a meeting of the Babbage Society. They discuss President Lincoln and what appears to be his growing madness. Brady's equations show that, if Lincoln lives, his policy of reconciliation will be discredited as the product of a diseased mind. The result will be a future of repression, rebellion, and racial pogrom. However, if he dies before the disease runs its course, the severity of the Reconstruction will be mitigated by his memory, just enough to blunt the worst of the excesses.*

Then he must die, Isaac tells him.

Brady demurs. Unlike the miscalculations that inadvertantly triggered the Civil War, removing Lincoln from the equations would be direct and deliberate. A calculated act, not a calculated risk. Isaac reminds him of their goal: the prevention of a future in which world-wide wars are fought with weapons of incredible power. To deflect this historical trend in time, he tells him, we must act now. No matter how personally repugnant, these measures are necessary.

Isaac also senses that Brady is withholding something. Pressed by his mentor, Brady reluctantly discloses a new equation; one that reduces the old man to tears.

It is 1990. Denver real estate developer **Sarah Beaumont** *is a self-made woman, who overcame the handicaps of the Chicago ghetto and what she believes is an ineffective educational system. She is a polymath, and has spent her whole life in learning, including such diverse skills as wilderness survival and computer hacking. Now financially successful, she prides herself on her independence and self-sufficiency.*

While inspecting a house on Emerson Street, she and architect **Dennis French** *find an 1892 newspaper clipping that recounts the death of Brady Quinn as a bystander to a gunfight. They also find a list of historical events. The entries, a curious mixture of the well-known and the obscure, are marked with 1s, 2s, or 3s. Among the entries is the "murder" of Brady Quinn. Intrigued, Dennis suggests Brady Quinn Place as a name for their new development.*

Sarah decides to follow up on Dennis's suggestion. She digs into Quinn's life in various archives and on the national DataNet. In doing so, she renews her acquaintance with her old partner, **Morgan Grimes,** *a reporter for the* Rocky Mountain News. *Morgan implies that he is working on a Pulitzer Prize story.*

Unknown to Sarah, her queries on the DataNet trigger an alarm, which is duly noted by Watch-keeper, **Red Malone**. *Several intelligence agencies share the Net Watch computer, which scans system activity in real time for attempts to access restricted or sensitive information. Individual agents can also "flag" particular files or subjects relevant to their investigations. The Watch-keepers are kept ignorant of the details; their only duty is to assure that the alarms are transmitted correctly and completely. When the code-name "Quinn" is triggered, Red duly notifies "Foxhound."*

Sarah discovers that Brady Quinn

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

was a statistician for the Interior Department who resigned in 1865 and went to Denver. In 1876, he abruptly sold his house on Emerson Street to a man named **Randall Carson** *and vanished from the public records. Sarah finds only one brief mention of him between 1876 and his death in 1892: in an account of an 1881 train robbery in which Quinn was wounded. She concludes that someone very persistant was hunting Quinn.*

She also encounters a sinister figure in the Western History Room of the Denver Public Library; a tall, thin man who goes through her notes while her back is turned. Another patron, a ranch woman who witnesses the incident, likens the man's attitude to that of a snake.

Meanwhile, Dennis French has been studying the list of dates. The odd mix of events irritates him, since he cannot see the rationale behind it. He consults an historian, **Gwynneth Llewellyn,** *who speculates that most of the entries were "trigger events," occasions when the actions of a relatively few individuals had disproportionate effects—often unexpected, and often many years later. However, the murders of Brady Quinn and a few others seem out of place, as they had no such consequences.*

Later, at dinner in the Tabor Center, Sarah and Dennis discuss their findings. Each is amused to find that the other has been sloughing important work to pursue the minor issue of naming the development. Sarah suggests that Quinn's death, and the other remaining entries, did have consequences. Negative consequences. They may have prevented *Something Important from happening. Then how did they get on the list? Dennis asks. How could anyone have known that something did* not *happen?*

During her search of the local real estate records, Randall Carson's name had caught Sarah's eye. He had once owned a building in the warehouse district near Union Station. Sarah has interests in that neighborhood, so after dinner with Dennis she decides to look it over. On her way there, she has the eerie feeling of being followed.

Because she takes an instant dislike to the lecherous night supervisor, **Paul Abbot,** *Sarah decides to inspect the Widener Building alone. Armed with a flashlight, she explores the deserted and unlit upper floors, where she finds ranks of old machine shop equipment which Abbot has been secretly stripping and selling for scrap.*

She also discovers a hidden stairwell, thick with dust. From the outside, the building only appears to have three floors, not four. Intrigued, she climbs the stairs, injuring her right ankle in the process.

The secret fourth floor shows signs of hasty abandonment. She finds an Index of mathematical papers, written between 1834 and 1892, dealing with system analysis, economics, and cultural studies. There are old machines, which she soon discovers are Babbage analytical engines. Sir Charles Babbage had described his ideas for mechanical digital computers in the early 19th century; but, supposedly, none had ever been built. Notes written in the manual for the engines indicate a connection between the machines, Carson, Quinn, and Thomas Edison.

Sarah is exhilarated by her discovery.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

It is a chance to become famous. She wonders why the machines were forgotten. With an invention like that, she realizes, they should have made history.

Leaving the building, she again has the feeling of being followed; and she wonders if it is the man from the library.

When she gets home, she writes a "tapeworm" that will search the DataNet for connections between Quinn, Carson, Edison, and Babbage. She lets it run for several days while she addresses the more pressing concerns of her business. When she reviews the worm's findings later in the week, she finds nothing to indicate that Edison ever worked on Babbage engines. Babbage himself had been interested in such things as probability and statistics, insurance, and systems analysis. She finds a notice by one Jedediah Crawford proposing the formation of a Babbage Society to pursue some of the ideas Babbage had raised. She recognizes Crawford as the author of the earliest paper in the index she had found. But why—if the Index extended to 1892—was there no further information on the Society in the Net?

Planning to investigate the putative Babbage Society further, she drives downtown. She visits Morgan, who promises to ask around among friends on the New York Times *and elsewhere.*

While she is crossing Civic Center Park, she stumbles on her injured ankle just as a gunman begins shooting at her. Her survival training takes over and she ducks for cover. The gunman proceeds to shoot others in the park until a policeman guns him down.

Sarah wanders off in shock and is picked up by Morgan, who takes her to his apartment on Capitol Hill. Although he has the opportunity, Morgan refrains from taking advantage of Sarah while she is stunned and confused. Instead, he dresses her scratches and washes her clothes.

The next morning, he asks her about the assault, trying to ascertain the reason for it. He quizzes her systematically on motives. In the course of their conversation, Sarah tells him about Quinn and the Babbage engines, swearing him to secrecy. Morgan doubts that it has anything to do with the attack, but promises to talk with Dennis and with Paul Abbot. He then asks her what she knows about Genevieve Weil, Daniel Kennison, and others. The names draw a blank from Sarah; but she has the impression that Morgan believes they are important somehow. Her old partner, however, always did play his cards close to the vest.

That evening, after visiting the police station, Sarah discovers Red Malone in her living room. Red has come to warn her (he says), but has arrived too late. He tells her she was careless in using her own Net Access Code when inquiring about Quinn. However, when he perceives that Sarah is genuinely puzzled by his remarks, he begins to backpedal.

Pressed by an angry Sarah to explain, Red tells her that a group of people he calls "Them" believe that she is close to unraveling a closely guarded secret. Her researches into Quinn dovetail with the actions of an unknown, called the Intruder, who was digging into certain other deaths. "They" have jumped to the conclusion that she is the Intruder and has made an inadvertent slip. If the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

secret gets out, Red intimates, it would mean lynching for Them; so They will stop at nothing to preserve it.

Red belongs to a second group ("Us") that also shares the same secret. Red's people, however, do not seem to be as ruthless. At least, Red could have killed her without warning and did not.

After he leaves, Sarah begins to realize that her prized independence has become something more like loneliness. But she shakes off the recollections of family and friends left behind and tries to reason out why she was attacked. She compares Red's revelations with what she has learned herself and concludes that the attack on her is only the latest in a long series of such attacks. It had started in 1876, when someone began killing certain Society members and Quinn went into hiding. Quinn had earlier broken with the Society (in 1867), forming a rival group in Denver. Then, after Quinn was killed in 1892, the offices in the Widener Building were abandoned. She surmises that Red's people are descended from Quinn's group; and that "They" are the original Babbage Society.

But what is the dreadful secret? Sarah finds connections between the subjects of the technical papers in the Index and the historical "trigger events" on Dennis's list. An uneasy feeling steals over her as she becomes aware that many of the papers were written years before *the events they analyzed mathematically.* Well, it's a science's business to predict, isn't it? *And if they had been studying history scientifically . . . Yet, she perceives something else. A sense of mastery and challenge. An anticipation of action, not simply observation. Of requirements to be met.*

They weren't scientists. They were engineers.

The thought arises unbidden in her mind, and it is a moment or two before she realizes what it means. When she does, the implication stuns her. They hadn't been trying to study cultural systems, at all; they had been trying to control them! No wonder They were afraid of being lynched if the secret got out! She might just give a hand with the rope herself!

So, I'm master of my own fate, am I? *she thinks bitterly. When Crawford, and Quinn and the others have scripted things out a hundred and fifty years ago? What a grand illusion. History has suddenly loosed its mooring, cast adrift, and nothing is what it seems. A charade. A Potemkin village. It is as if her mother's face has slipped just a bit, showing itself to be a mask; and behind the loved and familiar features is another person; a stranger, and not her mother at all.*

She sits in the dimly lit study, in the pool of light cast by her desk lamp, and shivers while the dying flames in the fireplace cast jeering ghosts upon the walls. In her ears, the cheerful ragtime of War Clouds, *is a mockery. She has never felt more alone.*

Sarah awoke with a start the next morning, slumped over her desk. Her neck and arms were stiff. She had vague recollections of a nightmare, now thankfully forgotten. *God, I must have fallen asleep at the terminal last night. How late did I work?* She stretched and pushed herself out of the chair. Stum-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

bling to the window, she pulled the curtains open and blinked at the morning sun.

She went to the kitchen and turned the coffee on. She stared at it numbly until it had started to perk. On her way to the front door, she noticed that the grandfather's clock had stopped. *Must've forgot to wind it.* She opened the front door and picked up the morning *News*.

As she did so, she remembered that she had stopped the clock herself, and that she had spent hours thinking over what she knew about Quinn, and that she had reached a frightening conclusion, and that someone was trying to kill her.

The nightmare returned. She stepped back and slammed the door and leaned against the wall, breathing fast. *Damn! That was careless, Sarah.* There could have been a sniper out there, waiting for her to grab her paper. She remembered opening the curtains. She had stood directly in front of the window, in plain view of anyone farther down the mountainside. Anyone with a telescopic sight. *Shooting uphill is difficult*, she reminded herself. The shots would fall short. And there wasn't any place for a sniper to hide except on her neighbors' properties. She peered through the peephole in her door. Nothing.

She closed her eyes and let her breath out slowly. Then she sidled back to the window and drew the curtains.

Returning to the kitchen, she threw the paper down on the table and tried to pour herself a cup of coffee. Her hand wobbled and the first drops hit the saucer. *Calm yourself, Sarah*, she chided herself. *Panic is always stupid.* She waited a moment, breathing evenly, then filled the cup. Then she sat and deliberately forced herself to read the paper, burying herself in last night's news.

None of the stories seemed to mean anything. She took in the stories of politics and business and trade talks and wondered how much of it had been engineered by Them.

At first, the article on page seven did not register. COUPLE SLAIN IN LOVE TRIANGLE. That sort of thing happened somewhere every day. A man named Joseph Dawson had trailed his wife, Barbara, to a West Colfax motel. There he had shot her and her lover, Paul Abbot, a co-worker, before turning the gun on himself.

Paul Abbot? The foreman at Widener's? She set her cup down shakily and reread the story. A sordid affair, like hundreds of others. Adultery. Jealousy. Rage. And she didn't believe it for one moment.

Poor Babs, she thought. And her poor husband. She even found a shred of sympathy for Paul Abbot. He had been an odious lecher, but he had been a human being. He hadn't deserved what had happened to him. She wondered if They had led Dawson into doing the deed, or whether They had simply killed all three of them and set it up to look like a sex triangle.

But why kill Abbot? And Barbara Dawson, the other foreman? She barely knew Abbot; and Dawson, she knew not at all. Yet, it must have something to do with the attack on her. It was too much a coincidence. She set her jaw and took her coffee to the computer desk where she began hacking.

One possibility was that They had

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

finally discovered the machines in the Widener Building and killed everyone who might have known about them. But the police records, when she moused into them, revealed no assault on Old Man Widener, the owner, or on any of the other employees. Nor was there anything regarding burglary or vandalism at the Widener Building. Surely, if They had found the secret room, They would not simply leave the machines there.

And that left only the fact that she had spent a long time inside the building with Abbot. Someone *had* been following her, after all. Perhaps They hadn't been sure about her at first. It had been a week between the business in the Library and the actual attack. What had happened in the meantime . . . ?

Her worm! It was running in the Net, hunting for connections between Quinn, the Babbage Society, analytical engines, and a half dozen other things. Nosing into Brady Quinn's life wasn't motive enough. By itself, it would have made Them nervous; but that worm must have scared Them silly. No wonder there had been no attempt to warn her off. *Based on what They thought I already knew, it was long past time for warnings.*

She hadn't seen any reason at the time to camouflage her worm. So, They had backtracked it straight to her home terminal as soon as They noticed it on the Net, thinking the Intruder had finally made a careless slip.

That meant They weren't omniscient. They hadn't noticed the worm for several days. For the first time, she thought of Them as human beings rather than as an impersonal force. They weren't infallible; They made mistakes. *They might be just as uncertain of Their next step as I am!*

Sighing, she activated her terminal and recalled the program. It was much too late to matter. Red was going on a fool's errand. He would never be able to convince Them that she wasn't the Intruder, now. In fact, once Red found out about the worm, he might begin to have doubts himself.

I know what They *do in such matters: when in doubt, kill. But what did Red's people do?* He hadn't actually said they *never* killed. Though Red would probably say "terminate with extreme prejudice." With a sudden chill, she wondered what sort of "adjusting" Red did.

She sighed and picked up the paper again. She looked at the headline. Now, it seemed, They were backtracking her activities, eliminating anyone else she may have talked to.

She stood up so suddenly that she jarred the desk; spilling the coffee. *Anyone else she might have talked to?!* She ran to the phone and punched Dennis's number. The phone was preprogrammed, so she only had to hit two buttons. Still, she managed to miss one in her haste. She cursed, cut the connection, and punched again.

The phone rang. "Come on," she muttered through clenched teeth. "Come on . . ."

Jeremy answered. Dennis's friend.

"Jerry, this is Sarah. Is Dennis there? I need to talk to him right away. It's important." *I might be wrong. I probably am. I* hope *I am.*

"You mean you haven't heard?" Jerry answered. His voice sounded dis-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

traught, as if he'd been crying. That was likely. Jerry was high-strung and sensitive. "Oh, it's terrible. It's simply awful."

Her heart stopped and her hand tightened on the receiver. "What is? What happened?"

"Dennis. He was struck by a car last night. A hit-and-run. We were on our way home. They took him to Porter. They were operating all night."

"Oh, no! Will he . . . Is he all right now?"

"I . . . don't know," Jerry admitted. "I've been calling and calling. Making a frightful pest of myself. They won't know until later today. They say his condition is critical. They've got nurses watching him, and he's hooked up to all sorts of equipment, so the doctors will know if there's any change."

Thank God for the space program, Sarah thought. *It boosted medical technology a century ahead. They save people routinely now who would have been lost only a few decades ago.* She was trying to reassure herself, she knew. Operations weren't miracles; and medicine was not theology. But "critical" wasn't "DOA," either. There was still a chance. A good one.

They must have more assets in place now, she thought. A hit-and-run late at night was a lot smoother take-out than a mad gunman in the Park. The police would ask fewer questions.

"Who did it, Jerry? Do they know?"

"Who? No one knows. Teeners high on mothers' tears or something. The police have a bulletin out; but they'll never catch them."

No, thought Sarah, *they never will.*

"And what damned difference will it make if they do?"

Privately, Sarah agreed. But she told Jerry some banal platitudes about having hope and how Dennis would pull through, and how everything would turn out for the best. She tried to sound very confident. She wasn't sure she believed it, and she didn't suppose Jerry believed it, either.

She hung up and thought. Who else? *Morgan!*

She had spent the evening with him after the attempt on her life. She had told Abbot nothing; but she had told Morgan everything. *He had promised to check into the Babbage Society for her.* He was going to ask questions. He would have no idea what he was walking into. She had to warn him.

She was punching up the City Room at the News when a new thought struck her. Morgan had told her yesterday that he would drop in on Paul Abbot and Dennis. Now, both had been attacked.

No, not Morgan! It wasn't in him!

But Red had implied that people could be programmed, without their knowledge or consent. The killer in the Park had been programmed, he said. Why not Morgan? How well did she know him? What was really behind the mask we call a face?

Even paranoids have enemies. But they could never have friends. She hung the phone back up. Morgan had said something to her about not turning her back on him. Was he trying to warn her, despite conditioning? In retrospect, his questioning seemed more sinister. He had been pumping her to find out how much she knew. Even then, she had had the impression that he knew more than

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

he was letting on. And she had told him everything: about Quinn and Carson, about the Babbage engines, about Dennis and his list of "trigger events."

Run and hide.

But running was serious business, not to be undertaken lightly. No point in running without good equipment. Where would she go? You can't hide by checking into a motel. It would have to be in the forest. Up in the High Country. Where was her survival gear? She hadn't gone camping in months. In the cabinets in the garage, she remembered.

For the next several minutes she busied herself loading up her Blazer. Where she was going, the Volvo wouldn't go. Down sleeping bag. It got *cold* at night in the High Country, even in the summer. Geological Survey maps. Compass. Kerosene lantern. Flashlight, with extra bulbs and batteries. Matches, the kind that struck anywhere. (In a pinch, she could start a fire with a bow drill; but why go out of your way to make things hard on yourself? Fishing line and hooks. Wire and wire cutters. Hunting knife and strop.

She pulled the knife from its scabbard. The blade gleamed wickedly in the light of the bare bulb suspended from the garage ceiling. She remembered the rabbits she had caught. The knife was perfectly balanced. It would make a complete revolution in thirty feet, a handy thing to know, as several rabbits had discovered to their sorrow. You could starve to death on a diet of rabbits, she remembered. Too lean; not enough fat. Survival trivia. Next to *real* survival, it had all been playacting.

She turned and jerked her arm and the knife planted itself in the center panel of the garage door. She grunted and recovered the blade, stuffing it into her rucksack.

The phone rang as she passed back through the kitchen and she stared at it as if it had suddenly come alive. After three rings her answering machine cut in. Hello, she heard herself say. I can't come to the phone right now.

She groped around under the breakfast bar and pulled out a stool. She sat on it and stared at the recorder.

When the tone sounded, it was Morgan Grimes who spoke.

"Sarah, this is Morgan. I've seen Dennis and read his list. There's something . . ." His voice sounded tense, sinister; or was that just her imagination? "Look, you're in big danger. Don't go anywhere. I'm coming right out."

The recorder clicked. Morgan had hung up. She sat looking at the machine a few moments longer. Morgan was coming. To kill her? That was crazy. She looked at the clock. Nine-fifteen. It was a twenty-five minute drive from Downtown to Applewood. She wouldn't have long to wait. She couldn't believe Morgan was one of Them.

In the bedroom, she changed into sensible hiking clothes. Bush jacket. Heavy trousers to protect her legs. Sturdy boots. A change of clothing in case she got wet. She was lacing up her boots when she remembered something Red Malone had said. *You can always run from a threat. Sometimes that doesn't work, either.* She wondered what he had meant by that.

She had climbed into the Blazer and

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

was about to open the garage door when the dashboard clock caught her eye. Nine-fifty. Was that right? She double-checked her wrist watch. Yes, it was. Morgan was late.

Or was he outside, waiting for her to open the door? Had his call been *intended* to panic her into running? She left the garage and returned to the front door where she looked through the peephole again.

Still nothing. But then, what could she expect to see? A man with a rifle? They wouldn't be so clumsy this time. A second try for the same victim in the same way would raise too many questions. Even the police might notice.

What should she do? Stay put or run for it? A sitting duck, or a duck on the wing?

The phone rang and she jumped. Again, she let the recording machine answer it for her.

"Sarah? This is Kevin, at the *News*. Call me right away. It's an emergency."

She went to the breakfast bar and sat on the stool, still looking at the recorder. She twisted her fingers together. *Kevin?* A vague sense of foreboding stole over her. She snatched the telephone and punched up the City Room. She asked for Kevin. "Tell him Sarah Beaumont is returning his call."

Kevin was on the line within moments. "Sarah. I'm sorry to have to tell you this; but your old partner, Morgan Grimes, was stabbed to death in the parking lot just a half hour ago."

Sarah felt as if a massive electric current had gone through her. Morgan? Morgan couldn't possibly be dead. He was a fixture, like Mount Evans. Always there. She remembered how they had traded insults during her cub reporter days. How he had shared bylines with her. How he had taken care of her the day she had been shot at.

She remembered how she had suspected him, feared his coming here, and was ashamed. Her eyes burned. It had been a crazy paranoid thought.

"God, no!" she said. "Do they know who did it?" She knew. It was Them. They were making a clean sweep of it. Morgan was dead, and it was all her fault. She hadn't warned him.

"A doper," said Kevin. "There was a packet of mothers' tears under his body and a thick wad of bills in his coat pocket. The police think he was scoring some dope and the deal went sour."

"Kevin, you know that isn't true!"

"Hey, I knew Morg' as well as anyone. I know that wasn't his scene. But it looks bad."

What could she tell him? That there were four easily-explained assaults in the last two days that were not so easily explained? A mad sniper; a love triangle; a hit-and-run; and a dope deal. The police would see no connection. And if she told Kevin, it would only mark him as another target.

"Sarah. The reason I called . . . His last words were for you. He said, 'Tell Sarah the Pulitzer isn't worth this.' " He waited for her to say something. She said nothing, and, after a pause, he asked, "Does that mean anything to you?"

"I . . . No. No, it doesn't." She thanked him for calling and hung up.

She couldn't think of anything else to do so she walked to the kitchen table and sat down. The remnants of her coffee were there, cold and stale. She

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

didn't bother to clear it away. She shoved it aside and laid her head in her arms. I never did repay him for how he helped me. Instead, I let him get killed. I could have warned him, but I was afraid. I was afraid and I didn't trust him. I should have known him better. I should have let myself get closer to him, back when we worked together.

'Should have' cuts no ice. What happened to the Sarah that was in charge of herself?

She's gotten an awful fright, that's what.

So what? So the circumstances aren't what you'd like. They're dangerous. Fine. You can't choose your circumstances. The four billion odd other people in the world do that for you. But you can choose how you face those circumstances.

That's easy for you to say. A very dear friend of mine is lying in a hospital mashed into Jell-O. Another one is in the morgue. And I don't suppose They'll stop at one try at me, either.

No, I don't suppose They will. So what do you do, give up? Giving up is the only solid-gold, guaranteed way to fail. They won't have to beat you, because you've already beaten yourself.

So what can I do?

Hit back!

At who, sucker? I don't even know who They are.

You don't have to know that.

She straightened. No, I don't, she realized. She set her jaw. She could pay Morgan back now. It wasn't enough. It would never be enough; but he would need a coin for the ferryman. She went to her terminal and set to work.

* * *

She spent the entire day in front of the screen, composing a program. It was rough going, even for her: a bi-level program, with the second program encrypted in the code of the first. On the surface, it would look like normal NetMail: billboard chatter on the hacker network. It could boot from terminal to terminal without arousing suspicion.

Buried deep within the harmless chatter was a cryptogrammatic algorithm. The cryptogram was self-booting and would trigger the second level program.

The second level was an anagram of the first. Embedded like a complex crossword puzzle in several dimensions, it would create a self-replicating worm. Whenever an off-line database linked up with the Net, the worm would inject a clone into the outside system. Once there, it would hunt for references to Sarah Beaumont, Dennis French, Paul Abbot, Morgan Grimes, Brady Quinn, Charles Babbage, and other names from the Babbage Society Index. If it didn't find them, the clone would erase itself. But if it did find them, or even most of them, it would send word back through a complex relay of Network nodes, then scramble the database. She used **JUGGERNAUT** for the scrambler. She had used it years ago, playing "Core Wars." It was crude, but effective; and They wouldn't be expecting it.

It might take a while, but eventually her worm would locate Their databases. An operation of that magnitude had to be on computer these days. Sooner or later, They would tap into the Net. When They did, she would know who and where They were, and she would have the satisfaction of destroying Their files. The odds were against any data-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

base but Theirs containing that particular collection of names, but at the moment she didn't much care if she scrambled the telephone directory.

She was almost finished when she realized what an idiot she was. She cursed herself for a fool. There was only one way to be safe when you knew someone's deadly secret, and she had overlooked it. She grinned wickedly and added another subprogram.

When she was finally done, she stretched and looked at the clock. It was two in the morning. She had been at the terminal steadily for almost sixteen hours. *Not even time-and-a-half for overtime*. But she felt satisfied. She was fighting back, however inadequately. Not a victim anymore. She might lose yet, still get killed; but at least she'd go down like John Henry, with a hammer in her hand.

God, she needed sleep. She hadn't realized how late it was. She hadn't eaten all day. Just a half-cup of coffee in the morning.

She wandered into the kitchen and began to fix herself a sandwich. It was dark in the kitchen. The refrigerator cast a lonely circle of light around her. Everyone around her was being struck down. But she didn't feel helpless anymore.

Tell Sarah the Pulitzer isn't worth this.

Those had been Morgan's last words. She remembered the day she had visited the *News*, when Morgan had been talking on the phone. What are you working on? The Pulitzer, of course.

She leaned on the refrigerator door. He must have meant that his knifing had to do with the story he'd been working on. He had been trying to get a message through, to one person who would understand. Morgan had wanted her to read his story file.

She closed the refrigerator and ran to the terminal, her sandwich forgotten. She hacked into the *News* system, again using a roundabout method, and keyed in Morgan's secret code, the one she had cracked years ago. A message appeared on the screen.

> Hello, Sarah. I know it's you because no one else could have broken this particular code. I hope you're not reading this, because if you are, then I'm dead and never reached your house. You wouldn't break into here just for fun. You're honest. A character defect in a reporter, but one I always liked in you.

"I liked it in you, too, Morgan," she whispered. Why was it we never told our friends these things while it mattered?

> The file you want is codenamed DEATHLIST. It's the story that was going to win me the Pulitzer. When I first stumbled onto it, I didn't know what I'd found. It was just a thread. Later I found another thread. I followed them and, somehow, they tied together. Then they tied in with a third item, and I had the hint of a pattern. It was just a hint, but it frightened me. Now, that business you asked me to check out for you? It seems to be still another thread. I wouldn't

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

have known except for Dennis's list, but now it all seems to fit. Sarah, there are a group of men and women operating in this country who make Murder, Inc. look like a bunch of pansies. There's no doubt in my mind that they have arranged killings, nation-wide for many, many years. But why? That's the puzzler. So far, their motive eludes me. Without that, I have no story.

What Morgan had uncovered, Sarah found, was a series of seemingly unrelated deaths. Most of them had appeared accidental, or easily explained. A suicide here; a barroom quarrel there. Car accidents. Crazed snipers in towers. The world, it seemed, was populated by innocent bystanders.

But there had been odd little connections. Two victims, widely separated in time and space, had been working independently on biographies of William Harrison Hatch, a little-known statistician of the 1920s. That odd coincidence had made him curious. Gradually, he had unearthed other circumstances linking two or more of the victims until, finally, he had a closed set of mutually connected deaths.

Orthogonal factor analysis, she remembered.

An odd twist: statisticians, ecologists, newspaper reporters, system analysts, policemen and certain other specialities had been represented among the victims far in excess of their numbers among the general public. Morgan had wondered, in a side comment, if the insurance companies had known.

At first, Morgan thought of it as a human interest piece: the strange synergies of a small world. Later, he became convinced that the coincidences were more sinister than that. For a while, according to his notes, he had thought that he had found the most bizarre serial murderer yet. *But the killings went on too long*. One person could not have done them all; unless he had started as a child and continued the grisly work well into old age. It had to be the work of more than one person.

He had followed a gossamer web of hints, remarks, half-world gossip. The trail was faint, and sometimes he lost it amid a confusing tangle of pseudonyms and anonymous phone calls. But Morgan was good at what he did. Sarah had always admired his dogged persistence and his native caution. He always found the trail again.

Eventually, it had led him to a small group of people whose sole remarkable feature was that, with few exceptions, they were unremarkable. John Benton, Genevieve Weil, Daniel Kennison, and a few others. Except for Kennison, who ran a well-known polling firm, they managed to stay out of newspapers; and they appeared to have nothing to do with one another. Sarah remembered that Morgan had asked her about them that time in his apartment.

All of them were wealthy, so wealthy that they were never mentioned by *Forbes*, or *Fortune*, or *Town and Country*. It was the kind of wealth that *never* advertised itself. All of them had increased already-considerable inheritances through good fortune in the stock market and foreign investments. As Morgan's note put it: "They bought Xerox before it became a verb."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

His interview with Sarah was in the file as well. He hadn't been sure at the time whether the attack on her belonged with the others; but he had hoped it did, because that could have given him a chance to learn their motive: Why would these wealthy people take such risks to kill total strangers? Until he knew that, he didn't have a story. No wonder he had been so interested in categorizing the different reasons for murder.

At the very end, there was a curious note. *Autocopy to Q-File*. What did that mean? Who else had Morgan sent the information to?

Sarah finished reading his notes and waited for the hard copy to print. It was all clear to her now. Morgan Grimes was the Intruder. In the middle of his list of forty-odd murder victims were the names of Kenneth Robertson and Alice McAullife, the two people that Red had asked her about. It was Morgan's snooping into the murders that had made Them nervous in the first place. More than forty killings? No wonder They had been nervous about discovery.

Morgan hadn't realized that the Brady Quinn mystery and his own serial murders had been linked. Not until he had seen Dennis's list. Agatha Penwether, the latest name on Dennis's list, was also the earliest name on Morgan's. No wonder Morgan had been so excited when he had called her. Dennis's information had extended his list of killings back to 1876, the year of Davis Belleau's murder.

But because he hadn't known, he hadn't exercised his usual caution. His inquiries into the murders had been quite discreet. If nothing else, the prominence of newspaper reporters among the victims assured that. But, like Sarah, he had asked about Quinn and the Babbage Society openly, on the Net and on the phone. That must have alerted Them. By the time Morgan realized that there was a connection, it was too late. He had already exposed himself.

His friendship with Sarah had been the clincher. They were already convinced she was "running an op" on Them; that she was, in fact, the Intruder. In a tragic irony, They must have figured Morgan for a partner. The night of the encounter in the library, Sarah had spoken with both Dennis and Paul Abbot. Then, after the shooting in the park, she'd spent the night with Morgan and, the next day, he had visited the same two men. So, rather than take chances, They had tried to eliminate all three of her "co-conspirators."

That explained why They had killed Paul Abbot, a man with only the most tenuous connection to her. She could understand now how he had seemed to be part of a threat to Them. But she hated Them for the Dawsons and the man in the park, who had been killed only for window dressing.

So much violence. Across so many years. All to protect the one vital secret: that They had been quietly directing the course of history for the last hundred and sixty years.

That was only a guess, that part about directing history; but it was the only guess that seemed to make sense. She wished that she had never deduced it. She wished that she could forget it; that everything could go back to the way it was, where history was something that simply happened.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

It was futile. Like a bird flapping against a window pane, nothing she did mattered because an anonymous little group had been quietly setting the limits for everyone else. She wondered if the bird would be any happier knowing about glass.

What you don't know can't hurt you. There was a folk saying for everything. A comforting formula to take the place of thought.

It was wrong. Ignorance always was. What you don't know can *kill* you. She remembered once seeing a sparrow die after flying at full speed into the side of one of the glass towers downtown. It had fallen to the pavement just in front of her. The memory still made her shake. She could see herself quite clearly as that sparrow, rushing full tilt, like how many others before her, into an unseen barrier.

Even if she could forget everything she had learned, it would only be the illusion of freedom. The walls would still be there, even if she never beat her wings against them; all the more powerful because you can never demolish a wall that you don't know exists.

But knowing that the walls were there, knowing that they had been built by other people, that did cause pain. An angry pain. *My whole life I fought so I wouldn't be just another victim. And now I discover we're all victims.* Like a prisoner who escapes from his cell only to find himself in a larger cell.

The Babbage Society had been running things for a long time and They had acted ruthlessly to remain in charge. But They had never tangled with Sarah Beaumont before.

* * *

The doorbell woke her up.

The insistent chimes (years ago she had programmed them with the first six notes of *We Shall Overcome*) repeated themselves like a stuck record. She put her hands over her ears. "Oh, shut up."

She always woke up hard. Abe, her old roommate, had made fun of that. He'd been the sort who jogged in the morning, and ate "hearty" breakfasts. Bacon (broiled, not fried) and eggs (soft-boiled, of course). While she struggled with her coffee. Their relationship had been doomed from the start.

She had crashed on the sofa early that morning, after spending all night on the terminal writing her program and reading Morgan's files. Now she looked blearily at the clock on the fireplace mantle. Noon.

The doorbell rang again and she wondered if she were going to answer it. Yesterday she had packed for hiding in the mountains, when she had believed, crazily, that Morgan was coming to kill her. Then, last night, she had finally taken steps to fight back. This morning (no, this afternoon) did she still plan to run?

Well, that might depend on who was ringing her doorbell.

Feline leaped up on the back of the sofa and prowled back and forth. He yawned at her. "Yaaaow."

Sarah held up her hands and Fee jumped into them. "How are you, Fee?" she asked him. "I haven't seen you for a while. Out tom-catting, I'll bet. Where were you when I needed you?" She remembered vividly the feelings of loneliness she'd had . . . What?

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Two nights ago? Her time sense was all screwed up.

Fee looked her in the eye.

"No, you're right. I shouldn't blame you. After all, where was I when *you* needed *me*, right?" Being shot at. Going catatonic at Morgan's apartment. She scratched Fee in his special place, just behind the skull. The door chimes rang again. She sighed. Even Dr. King would have tired of the tune by now. "Well, let's see who's so anxious to meet us."

She rolled off of the sofa and got to her feet. Remembering how carelessly she had gone to the door yesterday morning, she first went to the fireplace and grabbed the poker. Then she went to the door and peered through the peephole.

It was Red Malone. Dressed as a plumber, complete with a plumber's van parked in the road. She watched him fidget from foot to foot, then reach out and stab the doorbell again.

Sarah opened the door. Red stood for a moment, then stepped in. "It's about time you opened the damned . . ." He scowled. "What's so funny?"

Wordlessly, she held out the poker. He looked at it, then at her; and grunted. "At least I kept my part of the bargain. I rang your damned bell."

He walked past her into the living room and planted himself in the same sofa he had occupied before. Sarah followed and leaned against the archway that separated the living room from the entrance foyer. She laid the poker on the end table and folded her arms across her chest. Red looked at her and shook his head.

"Sarah, Sarah, what am I going to do with you? You diddled me good. You know that? I really believed you when you said you didn't know anything. Can you imagine how stupid I felt when They showed me the records you'd been searching? You've been a busy little lady." He didn't smile when he said it. Red had smiled so much on his previous visit that his serious demeanor now seemed ominous.

"I can explain that."

He nodded gravely. "Oh, good!" He stuck his arms behind his head. "I can hardly wait to hear."

"Don't you get flip with me, mister 'Adjuster!' Every word I told you last time was the truth!"

Red was angry. He leaned forward in the sofa and stabbed a finger at her. "Maybe every word was true; but you didn't tell me all the words, did you? Don't play games with me! The stakes are too high for game playing."

"Games? My God! A very dear friend of mine is dead, and another one may die, and some people I never knew at all are dead . . ." (Morgan was dead. Every now and then that knowledge intruded on her thoughts and stopped them cold. And he *had* been a friend; perhaps a better one than she had known. Brusquely, she shoved the memory aside. She couldn't allow it to hamper her.) "Dead," she repeated. "And you accuse me of playing games?"

He leaned forward and rested his arms on his knees. "You were hiding something, last time," he said stonily. "You knew more than you let on. That program of yours proved it! So give over. Who are you really and what is it you're up to?"

"I'm Sarah Beaumont. I'm a busi-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

nesswoman. My God, is that so sinister? Of course, I didn't tell you everything. I didn't want my plans to leak to my competitors. I was researching Brady Quinn because he looked like a good hook for a real estate project. That's all."

"No, that's not all. How did you make the connection with Babbage, Edison, and the others?"

"I . . ."

When she hesitated, Red snapped at her. "Come on! This is no time to be coy. It's your life we're talking about, not your damned balance statement. *I* know you wouldn't be stupid enough to use your own access code, but *They* are in a panic." He grimaced and looked away. "But I guess you know that already."

She pursed her lips and looked him in the eye. Could she trust Red Malone? He certainly acted as if he were trying to help her, but how could she be certain? She took a deep breath and made a decision.

She went to the terminal desk and retrieved the two folders. She dropped them in Red's lap. He looked at her, looked at the folders, and looked back at her.

"Go ahead, read them," she said.

He frowned at her. Then he looked at the folder tabs and his face went white. He paged rapidly through the sheets, exclaiming to himself. He looked up at her. "Do you know what this stuff means?"

She said, "I think so," and his shoulders sagged. She explained everything she had deduced the night before, about Quinn, Carson, and the Babbage Society. Red sat silently for a long moment. Then he shook his head and sighed heavily. "What irony," he said. "The most closely-held secret in history unraveled by a complete naif." He looked at her. "Congratulations," he said sourly. He waved the folders. "Where'd you find these?"

"In an old building down near the train station. Off of Fifteenth."

"So that's where it was," he said quietly. "We knew Carson had been headquartered somewhere in the old downtown; but we didn't know where. And we didn't know he had left anything behind when he moved, so nobody ever bothered to go back and look." He smiled apologetically. "There was a lot of confusion at the time, or so they say. If Carson had been more careful evacuating the place, there wouldn't have been anything up there for you to find. That was bad luck, your stumbling on those machines like that."

"Someone would have found them, sooner or later."

"Sure, and sold them for scrap without ever knowing what they were. That would have been best, I suppose."

She told Red what had happened to Dennis, Morgan, and the Widener people; but for some reason—perhaps a residue of mistrust—she did not tell him about the program she had written in revenge. It might be that he wouldn't interfere; but if she didn't tell him, he *couldn't* interfere. For now, silence seemed the best strategy.

"What happens now?"

He ignored her question and made a steeple with his fingers. "Where is that worksheet you found? The cliological analysis."

"As far as I know, the list was either

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

on Dennis at the time he was run down or it's in his office at home."

He grunted disapproval. "Worksheets should never have been taken offsite. They knew that, even back then, before everybody became so security-conscious." Red pushed himself out of the sofa and walked past her into the kitchen. He picked up the telephone and looked at her. "Mind if I make a call?"

"Can I stop you?"

"Yes," he said seriously and waited for an answer.

She shrugged. "Go ahead."

Red punched up a number, shielding the phone with his body so she couldn't see. Then he covered the mouthpiece and spoke into it for a few minutes. He listened a while, nodding. "Fine," he said. "It's a go." Then he hung up and faced Sarah.

"We're bringing some of our assets down to keep an eye on your friend. It'll be a while until they get there; but I don't think They'll try anything at the hospital. Someone will watch that history professor you mentioned, too; but I doubt she's in any danger."

"Thanks."

"What? Oh, you're welcome. But we're doing it as much for Ourselves as for your friend." He smiled. "Damage containment. Maybe we can find that list and destroy it."

Sarah grabbed him by the arm as he came through the archway. "I've told you what I know," she said. "Now it's your turn. Tell me what you know. How much of what I guessed is right? About the Babbage Society, I mean."

He pried her fingers off his arm. "There is no more Babbage Society," he told her. "It died a long time ago." He returned to the sofa and looked at his watch.

"You didn't answer my question."

"I know. I didn't intend to." He stared at his hands, turning them this way and that. "Old habits, they die hard," he said. "But I suppose there's no point in concealing things from you any more. It's too late and it won't change anything." He shrugged and waved her to a seat next to him. "Sit down. I'm going to tell you the damnedest story you ever heard."

She sat beside him. "I'm right, aren't I? The Babbage Society meant to control the course of history, didn't it?"

He leaned forward and clasped his hands together, staring at a point halfway across the room. He didn't look at her. "Yes," he said. "And no. You're overstating the case. They—We—we don't control history. No one can. Do you have any idea what an enormous task that would be? How much cultural energy would be required to alter the course of a major industrial society? As well as try to sweep back the tide. No, something like that would take generations of careful nudging; it would require a constancy of purpose over many lifetimes." He turned and looked her in the eye. "We gave it up long ago."

She frowned. There was something in the way Red had spoken. A tone of voice. She couldn't quite put her finger on it, but she had a feeling that he was talking to himself as much as to her. "Then what are you doing?" she asked.

He shrugged and looked away. "What else? Getting rich."

"Getting rich," she repeated.

"That's right. No grandiose plans to rule the world or control history. Just

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

minor adjustments here and there to enhance personal wealth and power. Disappointed?"

Sarah didn't answer him; but oddly enough, she *was* disappointed. A secret cabal planning to rule the world had a kind of mad grandeur to it. A secret cabal for personal gain seemed merely sordid.

"After all," Red went on, "knowing what the future holds in store is a terrific help when it comes to making money."

"I'm sure it is," she said wryly. "Isn't 'insider' trading illegal, though?"

He laughed. "I don't think the law covers our situation. We're talking about a grander scale. Think what an advantage it would be to know, say, that isolationism would keep the U.S. out of World War II until all our industrial competitors were ruined. Knowing that American companies would have no serious international rivals for twenty years opened up all sorts of investment opportunities."

Her jaw dropped, appalled. "At the cost of millions of deaths!" she said. "You take it pretty cold-bloodedly. Investment opportunities!"

He shook his head. "We didn't start the war. We didn't start isolationism. *It would have happened anyway!* We happened to have advance knowledge. Why not take advantage of it?"

"You could have tried to stop it!"

He cocked his head at her, amused. "Really? How?"

"I don't know. That's your department."

He snorted. "What do you want, a technical lecture?" She didn't answer him. He searched her face, then raised his hands in appeal to the ceiling. "She wants a technical lecture. All right," he said, glancing at his watch. "We've got some time. I'll give you the nickel intro." He paused, pursing his lips and squinting into the distance. "Start the way Crawford and the others started, with what we can observe and measure. They were interested in mass behavior. How many acres are planted in wheat versus corn. How many miles of railroad track are in operation. How many telegraph stations. And so on. Data collection was all the rage during the second quarter of the nineteenth century. Reformers like Adolphe Quetelet, the Belgian astronomer, were trying to create a scientific basis for a progressive social policy. They compiled all sorts of figures on population, climate, trade, poverty, education, crime, you name it.

"What the Founders discovered was that, in large groups, these behaviors followed predictable mathematical curves." He traced a curve in the air with his arm. "And, once the underlying equations were solved—using those Babbage engines you saw—the future path of the behavior could be predicted within statistical limits." He paused a moment and frowned. "They developed theories, using all three logical methods: deduction, analogy, and consilience. They weren't always right. After all, it was a brand new technology. But every time a prediction failed to conform, they went back and studied their model to discover what factor had been overlooked. Gradually, they became more accurate and precise."

"They studied history scientifically," said Sarah. "That's a long way from steering it."

Red clenched his hands together and

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

rested his chin on them. His eyes were unfocused, as if he were seeing those long-ago days. "That wasn't their intention, either. Not at first. But as they accumulated more and more data, they found that their curves forecast disaster. If the trends continued the way they were going, there would be a general world-wide collapse in the early 1940s."

Sarah jerked her head around and stared at him. "They were wrong, then."

"Were they?" Red wondered. "Or was their steering successful? How would you ever know? *I* know, of course. But if you didn't believe their math . . ." A shrug. "What they saw was a confluence of several trends: Germany would be united and become the leading scientific and industrial power; but the compression of population on resources after the mid-1800s, would also send her on a 'breakout' cycle. But, since all the easy overseas colonies would be taken by then, the breakout would be directed against literate and well-armed European nations rather than, ah, 'less sophisticated' opponents. Meanwhile, explosives were becoming exponentially more powerful. Put them all together and . . . Well, suppose Germany had had atomic bombs in 1939?"

"It never happened. Maybe their equations were wrong. You said yourself that they weren't always right."

He wouldn't look at her. "What would you have done? Stood by, because the forecast might be wrong? Or taken action, because the forecast might be right? They did what they had to do. They tried to adjust the trends, so they wouldn't all come together the wrong way. The Society was small and it only operated in the U.S. Their activities didn't carry much socio-kinetic energy . . ." He smiled in apology for the jargon. ". . . so they looked for focal points—fulcra, they called them; yokes were the mathematical operators—*times* where they could get enough leverage over large scale events. They aimed to build the U.S. into a counterweight to Germany. As a deterrent to the German breakout. Slavery was stifling our progress, so slavery had to go. The South was a poor, feudalistic, agrarian backwater in a rich, industrial world; but, because of the Constitution, she had a virtual veto over anything the Congress considered. *No* to 'internal improvements.' *No* to a Pacific railroad. *No* to protection for industry. They did what they had to do," he repeated.

A strange feeling went through her. They'd ended slavery? But it had been for all the wrong reasons! Not freedom or human dignity, but economics and technological progress. She remembered the tales her grandfather had told her about *his* grandfather. Economics be damned! "What did they do?" she asked.

He looked a question at her. "I just told you."

"I mean, how do you 'adjust' an historical trend? A country isn't like a TV. There are no tuning knobs."

He pursed his lips thoughtfully. "In a way, there are. Ideas are the key. Memes, we call them nowadays."

Something went click. Some of the titles she had read in the Index. "But they used to call them ideons, didn't they?"

He blinked in surprise and looked at her respectfully. "Yes. Elementary ideas.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Like elementary particles. Protons, electrons . . . and ideons. The analogies were all physical back then. Later, when Darwin's and Mendel's works became better known, biological analogies seemed more appropriate. Memes circulate in a culture the way genes do in a biological population; and they cause learned behaviors the way genes cause instinctive behaviors."

He shifted in the sofa to a more comfortable position. "Memes propogate through imitation and reinforcement of the behavior. Action triggers reaction—by other people and by the environment. The feedback from those reactions will reinforce the behavior, positively or negatively, through recognition, money, security, self-esteem, whatever's appropriate on the Maslow Hierarchy. The behaviors that maximize what we call 'biopsychological benefits' will tend to spread, because people naturally want to do things that bring them benefits."

"It's not that automatic. People aren't robots," she said through angry lips.

"No. Of course not. The whole thing is probabilistic. We've no way of knowing what any one person will do, unless we've psychoanalyzed that person pretty thoroughly. Some people will resist a mugger, for example. We don't know *who*, but we do know the *percentage*."

He licked his lips and glanced at her. "What we do is figure out which behaviors will give the results we want; then we encourage those behaviors through positive feedback and reinforcement. We reward the people who act the way we want. We've got the kind of wealth and influence nowadays to make it effective. And enough leverage in communications to . . ."

The anger boiled up and over. "That's despicable!" she spat out. "People aren't puppets!"

"Did I say they were? You're not listening. I only said that we publicize and reward the behavior we want. *We don't coerce it!* But people aren't stupid. If they think that a certain behavior will benefit them, a predictable percentage of them will imitate it *voluntarily*. That's why we have so many people in communications, as editors, speechwriters, programming directors, and such, people behind the scenes; to make sure the right memes get propagandized. Free will does the rest." He smiled ironically. "The statistics of cliology only work when people can choose freely. And besides," he added accusingly, "What else is a commercial supposed to do? Or a law? Or supervision in an office? Aren't they all attempts to encourage certain behaviors by holding out the promise of rewards?"

Sarah held her tongue. Red did have a point. But she wondered at what point the power to reward *became* the power to coerce. Manipulation was more subtle than force, but the results were much the same. And force, at least, had the one benefit of being open and honest.

Red waited a moment. His eyes flicked to his watch and he grunted. "No answer, right? Because Madison Avenue executives have been doing the same thing for years. What makes us better at it is that we know *which* behaviors to cultivate. It's not always obvious, you know. That's where Babbage's embryonic system theory came into the picture. It helped us see where to put our levers, so to speak. When the Society decided to end slav-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ery, they didn't go out and foment abolition. They pushed hard for the Homestead Bill and popular sovereignty in the territories, instead. That did more harm to slavery than *Uncle Tom's Cabin* or *The Impending Crisis in the South.*"

"I don't understand."

"Flank attack. Every action has unintended spin-offs. For example, the liberation of educated, white, suburban females meant unemployment for uneducated, black, urban males. And it doesn't matter that that wasn't anyone's intention!" he interjected, stifling her protest. "After all, proponents of defense spending never intended to hand the consumer electronics market over to the Japanese, either. But that's what happened when the cream of our engineering talent was lured into armaments and aerospace. Every engineer working on better bombs was an engineer *not* working on better TVs or stereos."

"So, what's your point?" she asked coldly. "That women's lib was bad? That defense spending should have been cut?"

Red waved his hand and made a sound of contempt. "Don't give me that crap. Just because an action has desirable consequences (at least, desirable to you), you think there shouldn't be *undesirable* consequences, as well. Well, maybe there shouldn't, but there are! And *vice versa*, too. Bad things can have good spin-offs. Tell me who is better off today, the descendants of the blacks who were brutally kidnapped into slavery? Or the descendants of the ones who were left behind?"

"That's no justification for the slave trade!" she said.

"Who said it was? *Justice has nothing to do with it!* Look, I was born an American, and I'm thankful; but I'm not thankful that a million people starved to death in the potato famine or on the 'coffin ships' to do it. It's not a matter of what's right or what's wrong, just or unjust. The system doesn't *care*. The point is, nobody can do just one thing. Change one component and the rest of the system reacts, maybe years later and in ways you don't expect. In ways you won't even *like*. Even we get taken by surprise now and then. The interactions are complex."

She shook her head. "Complex? It sounds damned impossible. Like predicting the motion of a mobile with a million parts."

"Difficult," he admitted, "but not impossible; once we have reliable models. And we've been refining our models for over a century."

"Nuts! There are too many variables."

Red shrugged again. "Sure. The more the better. Then they cancel each other out. Besides, the Pareto Principle comes into play. Study twenty percent of the factors and you'll learn about eighty percent of the performance. If you don't believe me, find out what percentage of authors account for most of the technical papers published; or how many running backs account for most of the yardage gained."

"That's too simplistic. There are no simple answers to complex questions!"

"Really?" He smiled in a patronizing manner. "*Who told you that?* That's a prime example of a meme that's flourishing in our culture. People pass it along to each other like a bad cold. But, have you ever wondered who planted

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

and encouraged that meme, and why? Is there a better way to prevent people from duplicating the Society's work? From even *trying* to duplicate it?" He grinned smugly.

Sarah stood abruptly and stalked to the other side of the room. Fee, seeing her move, jumped up and followed her. She pointed a finger at him. "Fine. That's just great. You and your friends have been tinkering with other people's destinies, but not to worry, because you only tinker a little!"

"And you think we shouldn't tinker at all? Don't forget, a tinkerer is someone who fixes things."

"No. Keep your hands off other people's lives."

"Ah! *Laissez-faire*. You're like right-wing businessmen or left-wing environmentalists. You believe humans should not interfere with the System."

"Right. Deliberate interference by humans is unnatural. It upsets the economic or ecological balance. History should run free. Like a wild river!"

He laughed. He threw back his head and roared and slapped his knee.

"What's so funny?" she asked suspiciously.

"That people like you think human behavior is unnatural. People are part of nature. Just what do you think history *is*, Ms. Beaumont? It's nothing *but* human intervention! People are constantly trying to change things—or keep them from changing. You're doing the same thing you condemn us for."

That stung. She felt her cheeks flush. "What do you mean by that?" she demanded.

He waved his hand like a beckoning. "Tell me again about your Emerson Street project. Trying to change the history of Capitol Hill, weren't you? Buying and selling houses to alter the settlement patterns. Changing the course of people's lives, without their prior knowledge or consent. Would the residents there *want* your new gentrified neighborhood? Maybe they like things just the way they are."

"Now, wait a . . ."

"And you're doing it in secret for personal gain, just like us," he went on over her objections; "because if anyone found out, your plan wouldn't work and you wouldn't make a big bundle. The only difference between what you do and what we do is that *We're better at it!* We use statistics and the scientific method; but everyone is tinkering with history every day. So don't get on your moral high horse with me. Is it morally superior to tinker ignorantly and haphazardly like the rest of you? Why is it better to do it blindly?"

"It *is* different!" she said, choking the words out.

He folded his arms. "Really? Tell me how."

"The rest of us don't kill people!"

He froze. Then he grimaced and dipped his head in acknowledgement. "There is that," he admitted. "Although I will say that stumbling blindly through history has killed more people than They ever will. Things went wrong for the Society a long time ago, terribly wrong." He rubbed his hands together. "Look, when Crawford and the others formed the Babbage Society, they never intended anything like what's happened. Remember, they were trying to save the world."

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

"Good for them," she said sarcastically.

He looked hurt. "They were," he insisted. "Oh, I'm not saying no one was hurt. People died because of things they did. The War Between the States . . . Well, we still don't know why that happened. Something was overlooked in the equations. But only rarely did they ever feel compelled to terminate specific individuals."

"Let's tell the Vatican. Maybe they'll be canonized."

He screwed his face up. "I'm not making excuses for them. They weren't saints by any means. They did what they felt was necessary, and the choices were often personal agony. They never authorized a termination lightly or simply to protect themselves. It was all for a greater good. To prevent what they saw coming. Genevieve is . . . different. To be honest, I don't think she's quite sane."

"Genevieve? Genevieve Weil?"

He looked at her shrewdly. "Yes. I see you've heard of her. She's Their chairman. The fear of discovery has driven her mad, I think. Her mother's fault. The old bitch never kept anything from her, even as a child; and she used to imagine angry mobs coming to their house to tear them limb from limb because they had discovered Mommy's Secret. Her mother used the fear as a lazy way to discipline her. 'Do as I say or I'll tell the newspapers about us and people will come and kill us all.' Can you imagine saying that to a six-year-old child?"

"Am I supposed to feel sorry for her because she had a difficult childhood? I'm sorry, I don't." But she couldn't help imagining the tiny child; afraid to have friends; afraid of saying the wrong thing; constantly terrified of exposure for things she did not understand and had no part in starting. Her mother had been cruel and abusive. Beatings would have been kinder.

"Sorry?" mused Red. "No. Understanding, perhaps. So that, if someday you have to kill her, you can do it without hate. Kennison and the others, they're a little afraid of her themselves; but her family has been recruiting and promoting people for a long time now and they're all her willing followers. Natural selection, I suppose. It was her great-grandfather that split the Society. He realized how he could use the Society's own tools to take over the Society itself. A ruthless bastard. I don't know how he ever got by his recruiter. If it hadn't been for Quinn, he would have succeeded. Brady Quinn knew the split would happen someday. He didn't know who would do it, of course. It was years and years before it happened, and Grosvenor Weil wasn't even a recruit at the time. But he and Carson had calculated that the . . . *coup* was inevitable, and they took steps to preserve something of the original Society. It broke old Isaac Shelton's heart when he told him."

The telephone rang and they both started at the sound. Sarah glanced from the phone to Red. "Go ahead," she told him. "You've been waiting for it to ring."

He cocked an eyebrow at her and she pointed to his wrist. "Because you keep looking at your watch every few minutes. That's how. Go on. Answer it."

Red went to the kitchen and took the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

phone off the wall. He listened without saying anything. Then he smiled and bowed to her. Before he could complete the bow, however, his smile froze and a look of surprise crossed his face. He turned his back on her. "Say again," she heard him whisper.

Whatever the message was, she decided, it was not what he had expected. Now he was making plans. Plans for her. Sarah wondered what her own best move should be. Red was personable and his arguments were well reasoned; but she wasn't about to succumb to them. Or to let him decide things for her. She remembered that she had packed her Blazer with survival gear and it was ready and waiting for her.

Red hung the phone up and faced her grimly. "Your friend has vanished. He's not in the hospital; and Porter's computer never heard of him. According to their records, he was never admitted."

She gasped. "But he was! Jerry spoke to them! He was in the critical care unit!" Somehow, she had thought Dennis safe from further harm in the hospital. There was a bitter taste in her mouth. Despite Red's assurances, They had gotten Dennis after all. Red stammered an apology. His people couldn't have reached Porter any sooner. She barely heard him. Too many shocks. Too many shocks.

A hand shook her shoulder and she looked into Red's face. "Come on," she heard him say. "There's been a change in plans. We've got to move."

Immediately, she became cautious. Fee rubbed against her pants leg and she reached down and picked him up. He settled into the crook of her left arm and she stroked him absently, and perhaps a little firmly. "What do you mean? Where are you taking me?"

"Why, to Our place, of course. We're supposed to meet Janie at Falcon Castle. She'll take you from there."

"The Walker Mansion ruins? Isn't that a bit melodramatic?"

He lifted his hands. "She picked the spot. It's close by, and not many folks know about it."

"Suppose I don't want to come with you?"

"You don't have to. We never interfere with free choice. You can come with Us, or stay here and get killed."

"Some choice!" she muttered.

Red laughed when he saw her well-stocked Blazer. "You won't need all that paraphernalia where we're going," he said.

"I haven't decided whether I'm going with you," she answered. "Going with you isn't the only alternative to staying here."

He pursed his lips and nodded. "Maybe, but it's the smart move."

"So you say."

"My plumber's van is less conspicuous."

"A 4 × 4 is hardly conspicuous in Colorado."

"I didn't mean that. I meant that They probably know what cars you drive."

Her patience had worn thin. Red acted as if the whole business of manipulating history was one big game. "Will you quit that Us and Them crap!" she snapped. "They're the Babbage Society and you're . . . What? Utopian Research Associates?"

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

He nodded. "Yes. But We never call Them the Babbage Society. Men like Shelton and Crawford and Hammondton, were men of the highest ideals. Grosvenor Weil perverted those ideals. Nowadays there's practically nothing left of the original memes of the Society."

Men of the highest ideals, she thought. Trying to save the world. And they had killed people and accidentally set off the Civil War in the process. Maybe that was the trouble with high ideals. From such a height, ordinary people begin to look small and unimportant. When the goal is a century away, the needs of today tend to fade. "Have it your way," she said, "but I plan to keep my options open." She climbed into the cab of the Blazer and slammed the door. Fee settled into his usual place in the center console. She'd removed the lid to it when she bought the car and had made a kind of padded cat-seat out of it. "See you around," she said and hit the garage door opener. She started the engine and put the Blazer in reverse, but before she could back out, Red yanked open the passenger's door and hopped in beside her. She braked sharply and looked at him. He was buckling his seat belt. "What do you think you're doing?"

"Well, if you won't come with me," he said reasonably, "I'll have to come with you. Maybe I can answer some more questions for you. Maybe I can still convince you to come to Falcon Castle. Janie'll be sore as hell if we don't show up."

"My heart bleeds for her. Who is Janie, anyway? Your wife?"

He looked startled. "Wife? Me? Are you kidding? I'm the wild and independent sort. No, Jane Addams Hatch runs the local safe house. She was sure you'd opt to join the Good Guys."

Carefully, she backed down the steep dirt driveway to Foothills Road, twisting in her seat to watch. "I know that They're the Bad Guys," she told him over her shoulder, "but I'm not convinced that you folks are the Good Guys."

"We're the enemy of your enemy," he said.

"That doesn't make you my friend. You're doing the same thing as the Babbage people, aren't you? You're simply not as ruthless about it."

Once on Foothill Road, she looked both ways for traffic. There were a few cars parked alongside the road near the houses. She shifted into forward and headed toward Eldridge.

"It's the shoddy workmanship that bothers me," she said.

He turned and looked at her, startled.

"You and your friends have been tinkering with history for what? Almost a century and a half? You've been doing a piss-poor job of it."

Her comment took him by surprise and he laughed. "I suppose it does seem that way to you. What new technology has ever been put into practice without a few blunders? But, hell, we must be doing something right, because, after all, we make money at it."

"Yeah. Good for you," she said acidly.

He didn't answer her and she spared him a covert glance or two as they drove. He was leaning his elbow on the door window, his fist propping his head up, watching the houses go by.

"Here's a puzzle for you," he an-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

nounced suddenly. "Suppose you saw a young boy about to be run over by a bus. Would you try to save him?"

She glanced at him then back at the road. "What? Sure, if I could."

"Good. But now suppose you knew that if the boy lived he would grow up into another Hitler. Millions would die because of him. Would you still try to save him?"

She scowled and would not look at him. "How could I know something like that?"

"Grant me the supposition. You know it. ESP. Whatever. What would you do?"

"That's no choice."

"Yes it is. No one ever promised you that the choices would be easy, or pleasant."

At Eldridge, she turned left toward 32nd Avenue. She clamped her jaws shut, refusing to answer. She saw what Red was getting at.

"Of course, *not* deciding is also a decision," he told her. "You will have to do one or the other. Save him or not." Red waited a while, watching her. "What really makes it agonizing," he said at length, "is that you *know* the boy personally. He delivers your morning paper."

She closed her face up tighter and kept her attention firmly on her driving.

"And now take the supposition one step further. This child, who, beyond any hope of doubt, will kill millions of other innocent people . . . What if he's *not* standing in front of a bus? Would you *push* him?"

"Jesus Christ!" she whispered harshly. The words escaped from her involuntarily. She looked at him and there wasn't a trace of a smile on his face.

"Yes. Although I don't know if even He could help. Knowing the future is a mixed blessing. Maybe we foresee a disaster coming. But to avoid it requires terrible measures. People will suffer; some will die. But if we do nothing, then we allow the original disaster to happen. We're responsible either way. Cliology has created new problems for decision-makers."

She grunted. "It sounds like an old problem to me. Do the ends justify the means?"

He shook his head. "It's not that simple." He looked away from her, out the window, as they pulled onto 32nd. "It's a philosophical trap," he said. "Where does responsibility end? No matter what we do or don't do, there will be pain. A different set of people suffer and die, is all. It's knowing about it in advance that changes things. What can we do, but try our best, knowing our best isn't good enough."

They drove in silence after that, only the tires making any comment. She pulled onto the westbound Interstate at the 32nd and Youngfield ramp. She kept the Blazer at the speed limit and cars passed them constantly, their drivers sparing her dirty looks. *This is crazy*, she thought. She couldn't go into hiding with Red tagging along; and she could hardly keep him prisoner. She would have to dump him someplace soon.

"Do you know how to get to Falcon Castle?" Red asked.

"What? Sure. Out Turkey Creek Canyon to Parmalee Gulch Road. I've

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

hiked most of the Foothills around here. But I'm not going there."

"Yes, you are."

She turned and looked at him. His automatic was trained on her head. Red's gaze was as steady as his gun. She held his gaze for a moment then turned her attention back to the road and ignored him. She concentrated fiercely on her driving, wondering if she had judged Red rightly. She could feel the sweat in her armpits.

Then she heard him sigh and put the gun back in its holster. "You saw the safety was on, didn't you?"

Actually, she hadn't seen. She smiled to herself. She had known that Red wasn't going to shoot her because it just wasn't in him to do it.

"I'll answer your question for you now," she said.

"What question?"

"About the boy and the bus. For me, the answer is simple. Save the boy. Not for his sake. He may grow into the monster you described. And not for his victims' sakes, either. *But for my sake!* Do you understand that? You don't hurt people for things they haven't done yet. If I didn't try to save him, I would lose myself."

Red nodded. "You would have made a hell of a recruit," he said. He looked out the window at the passing scenery. It was barren country, all browns and no greens. Scrub brush and buffalo grass, with a few evergreens spotted here and there. There were a few scattered houses. Off to the right, he could see a trailer park in the distance. Green Mountain hulked on their left. "Where do you plan to drop me?" he asked.

Sarah checked the rearview mirror and pulled into the right hand lane. "There's a foot trail from Morrison up to the castle," she told him. "I'll drop you there. It's a three mile hike, about 2,000 feet up. You up to it?"

He shrugged. "Sure."

They went through the cut in the Hogback, with its odd sign: Point of Geological Interest. When the Interstate had been dug through the high thin ridge that paralleled the Foothills, it had exposed the colorful folds of ancient seabeds, set like diagonal stripes beside the roadbed. A parking area and path had been built so that people could "walk back through time." Red stared curiously at the sightseers.

"Ever been out this way before?" she asked him.

"What? Oh, once; years ago. Camping. The Associates have a ranch southwest of here."

They pulled down the exit ramp and Sarah turned left onto Morrison Road. The Interstate banked above them, curving up Mount Vernon Canyon toward Georgetown and Silver Plume. The High Country. Sarah longed to be up there, in that wild and beautiful land along the timberline, among the krummholz and tundra flowers. Alone and free. But to be alone, she had to dump Red. To be free . . . Well, that was another issue entirely. To be free, she had to tear down the walls the Society and the Associates had built. Yes, and the walls she had built, as well.

The road to Morrison ran south between the Hogback and Mount Morrison. Ahead on the right, Sarah could see Red Rocks Park, with its sandstone formations weirdly carved by millenia of winds. She checked her mirror again,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

made a snap decision, and turned sharply into the park.

Red looked at her. "Someone's following us, right? You keep looking in your mirror."

"A dark blue sedan," she told him. "It got on the Interstate right after we did and stayed behind us, even though I deliberately drove slow. He got off at Mount Vernon with us, and . . ." Another glance in the mirror. "Now he's decided to visit Red Rocks, too. If you've got another explanation, I'd be glad to hear it."

The blue car was hanging way back. To be less conspicuous, she supposed. That gave her an idea. She kept to the high road through the park. On the lower road, she would be clearly visible to him; but the high road twisted its way in and around the sandstone and the sight distance was limited. Maybe she could lose him.

The park had its usual quota of weekday visitors. Cars were parked along the roadside and people were hiking and rock climbing. One man with a beard was strumming an acoustic guitar to a circle of admirers. *Too many witnesses here*, she thought. Whoever was chasing them wouldn't dare try anything. Then she remembered what had happened in the Civic Center and felt fear. Who knew what they would dare? She had been foolish and reckless to come through the park.

No help for it now. Past Ship Rock and the Amphitheater she came to a fork in the road. She checked behind her. The blue car was still out of sight behind the rocks. She made a sharp right at the fork and floored the gas pedal. The Blazer spun on loose gravel then the tires gripped and they shot through the narrow roadway past Creation Rock. If she could be out of sight before her pursuer reached the fork, he would probably assume that she had continued straight through. The road she was taking now had fewer turns. She could gain some distance on him; maybe throw him off their track.

A few minutes later, they came down from the Rocks past the mouth of Bear Creek Canyon and into the town of Morrison. There was no sign of the blue car. She wondered if their pursuer knew yet that she was aware of him. She turned right onto Route 8 and headed south again.

Red twisted in his seat and looked behind them. "Didn't you say you were going to drop me in Morrison?"

"The trailhead's up ahead yet," she told him. "But I've changed my mind. It's too risky. I don't know if I shook our friend back there and I'd rather not get caught in the parking lot there. Besides, the first mile or so of the trail is across open meadow. If our friend has a gun, we'd be sitting ducks."

"We?"

Sarah took a deep breath. Decision had come quietly, without her knowledge. "We," she admitted. "I guess I do need your help after all."

"It's not disgraceful to need someone's help, you know."

"It is for me."

Mount Falcon rose on their right. Like most of the Foothills, it was a low, broad mountain. The peak was a shade over two miles away, rising to just over 7,800 feet, 1,800 feet higher than the roadbed.

She looked in her mirror and her

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

hopes fell. "Our friend is behind us again and he's coming up fast. Closing the distance."

"Then he knows we're on to him."

"Christ! He's got a gun, Red! He's stuck his arm out the window."

"Don't worry," Red told her. "Shooting a pistol left-handed from a moving car at another moving car at sixty miles an hour at this distance? Hell, he'd be lucky to hit that mountain."

There was a sharp crack and the rear window distintegrated into flashing shards. Something buzzed in the air between them and smashed into the tape-deck. Fee howled and ducked into his console.

"Unless," Red continued thoughtfully, "that's Orvid Crayle behind us. He's very good." He zipped open his repairman's coveralls and retrieved his automatic. He checked the action, then unbuckled his seat belt. "Well, Orvid and I were bound to cross swords someday." He looked at her and smiled. "I'm pretty good myself."

"I bet you are."

Red climbed over the seat and made his way to the back of the Blazer. "I think you've met Orvid already," he commented. "Tall, thin fellow. Looks like death warmed over?"

Sarah recalled her encounter in the library. "Yes. I think I have. Pleasant kind of guy? Faultless manners?"

"That's the one. Orvid's Their Station Chief here in Colorado. You know what that means, don't you?"

"Sure. More good news. You don't send management out on a job unless you're shorthanded and there's no one else available. I don't know how much more good news I can take."

Red laughed. "That's the spirit." He braced himself against the back seat and, with his feet on the tailgate, he drew a bead through the shattered rear window. "Try not to hit any bumps for a while," he said.

"Right," Sarah muttered to herself. She floored the gas pedal. Crayle probably had the edge on them in speed, but there was no point in making it easier for him to close the distance. Unfortunately, Route 8 was relatively straight through this stretch of country. No twists or turns to confuse the aim. She wished Red would hurry up and get it over with.

Two cars approached from the opposite direction and, glancing in the mirror, she saw that Crayle had pulled his gun in. *He's not going to throw himself away*, she thought, *like he did with the man in the Civic Center*. Crayle was at least as interested in getting away as he was in getting the job done. He wasn't a fanatic or an automaton. That might give them an edge. "Hey," she said. "What we should do is just drive around until we find a police car. Crayle won't dare try anything then."

"Sure he would," Red's voice replied. "He'd gun us down and flash a badge. CIA or something like that. Claim we were fugitives. Local cops would buy it, because, whatever badge it was, it'd be legit."

"Can't you flash a badge, too?"

"Not with a half dozen bullet holes in me." Red paused, then added thoughtfully. "I'm sure he'd rather not use his cover if he could avoid it. He might get away with killing us in front

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of the police; but his superiors would hear and know that it wasn't a Company operation. The word would get around the Community that maybe he'd been turned or had gone rogue."

Bang! The noise was loud inside the Blazer and the car swayed as Sarah jerked convulsively. "Hold the car still," Red demanded. She realized that Red had squeezed off a shot. "Did you get him?" she asked. No answer. He fired twice more and Sarah flinched at the sound. "Did you get him?" she asked again, a slight edge to her voice.

"Yes and no," he told her as he climbed back into the passenger's seat. "I got his radiator and his front tires. Bigger targets than his pointy head. His tires are flat and he's losing water. His engine'll overheat and seize up."

She closed her eyes briefly and breathed a sigh of relief. They were going to get away and Red hadn't had to kill anyone. She didn't like Crayle. She *hated* Crayle; but she was glad Red hadn't killed him. "Then we're going to make it," she said.

There was another loud bang and the Blazer veered sideways. In a panic, she fought the steering as they skidded zigzag down the road.

"Unless," Red said calmly, "he shoots out our tires, too."

Sarah spared him an exasperated glance.

Red shook his head in reluctant admiration. "Damn, he's good."

She managed to bring the Blazer down to a manageable speed without spinning out. Both rear tires were making floppy sounds. She took a shaky breath and was amazed to discover how calm she was. Uncertainty breeds fear, she thought. There were no uncertainties now.

Behind them she saw Crayle already stopped by the roadside. Steam poured from under his car's hood. Crayle stepped out, dressed in a long, tan overcoat too warm for the weather. His left hand was jammed in his pocket. He looked from his car to them, kicked the car once, then started after them on foot. He didn't run, but he took long, quick strides, the kind that ate miles.

"He's persistent, too." she told Red. Crayle knew that, with their back tires gone, they weren't going far. Certainly there was no chance of making it to the entrance to Falcon Park around the back side of the mountain. And once they were all afoot, Crayle only needed to close to within pistol range. With his aim, he'd have them.

Desperately, she tried to picture the Geological Survey map in her mind. She'd been over this area before, about a year ago. There was a dirt road that led from Route 8 to the base of the mountain. They could climb from there. It wouldn't be hard. Just hands and feet. Once they reached the trail on top and the rendezvous point, Janie could drive them to safety. Crayle, on foot, would be helpless to stop them. If only they could gain enough of a lead on him.

She came on the turn suddenly and jerked hard to the right. The Blazer slewed and wobbled and she winced at the abuse the wheels were taking. She could see hunks of rubber behind them. They'd be riding on the rims shortly.

"If you're thinking about stopping to change the tire," Red remarked dryly, "I wouldn't recommend it." He pointed to where Crayle was cutting diagonally

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

across the meadow. He was following Strain Gulch, trying to head them off.

"Yeah. Where's the Indianapolis pit crew when you really need them," she said. Red snorted. "Besides," Sarah tapped the gas gauge, "this needle's dropping faster than usual on this gas hog. I think one of those shots got the tank or the gas line." She nibbled on her lower lip. A spark might have made it burst into flame; turned the Blazer into a giant Molotov cocktail.

The road came to an end. Sarah braked and turned the engine off. She reached around behind her and snagged her back pack. "End of the line," she told Red, kicking the door open. "We walk from here."

Red hopped out. "Up there?" he asked, staring at the mountain.

"You got a better idea?" She turned back to the Blazer and held the pack out with its front flap open. Fee nosed at it, meowed, and jumped in. It was 'his' pocket when they went on hikes. She sniffed. The gasoline smell was sharp. The gas was definitely leaking out.

"You're taking the cat with us?" Red asked.

Sarah was shocked. "Of course! Feline P. Cat isn't just a cat! He's . . . Fee! He and I have a contract. I give him food, shelter and affection, and change his kitty litter; and in return he sometimes rubs himself against my leg. If he feels like it."

Red cocked a speculative eye at her. "Does what he likes, when he likes, eh? Answers to nobody but himself. Some people are like that, too."

She had hitched the pack onto her back and was making her way up Strain Gulch. "Are you going to stand here flapping your lips just to feel the breeze? Let's go. Those shoes of yours will have to do."

Red spared a look back down the gulch. Crayle was a thin figure in the distance, still coming implacably onward. *Like a force of nature*, he thought. He gave in to impulse and waved at their pursuer. Crayle paused and raised an arm in reply, but Red didn't think he was waving more than one finger. He laughed and turned to follow Sarah.

Scrambling up the draw where Strain Gulch came down the mountainside, Red found himself face to face with Sarah's cat. Fee's head stuck out of his pocket, surveying the scenery—and Red's struggles—with serene indifference. Red made a face at the cat. Then he slipped on a loose rock the size of his fist and stumbled to his hands and knees. He cursed and brushed himself off, scowling at the cat.

"What good is that stupid cat, anyway?" he asked in annoyance.

"Keep climbing," Sarah answered without turning around, "and stop wasting breath. And if you have to ask what use a cat is, you don't deserve to know the answer."

Red grinned at her back and ran to catch up. The ground became steeper and the sides of the draw closed in upon them. The slopes on either side were lightly forested with evergreen trees and bushes. Looking up, he could see rounded peaks on either side with a third and higher peak directly ahead. The ascent in that direction seemed more gradual. Sarah zigzagged across the draw taking advantages of local variations in the ter-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

rain. Red followed. He hoped she knew where she was going.

At one particularly steep stretch they crawled on hands and knees to keep their balance, holding onto shrubs and outcroppings to pull themselves along. Red grabbed a plant and it came out of the dry, dusty soil by its roots. He slid three feet down the embankment, scraping the skin on his hands and cheek, and striking his knee on a rock. He winced at the pain. Sarah turned and, gripping a sapling with her right hand reached down to him with her left. He flushed and took it.

He looked into Sarah's calm, brown face. *So this climb is just a brisk walk for you,* he thought. *I'm a city boy and you're a backpacker, but I'll make it. I'm at my best when I'm challenged.*

He pulled himself up by her arm and they resumed climbing. Red threw himself into the effort with renewed energy. He began watching what Sarah did. Where she placed her feet. How she chose the route. He followed doggedly. His breath came hard and ragged. Once, he looked back and was surprised to see how high they had come. The Blazer was out of sight behind the trees and rocks, but they were easily 800 feet higher up.

He slipped a couple more times on rocks and loose gravel but managed to grab something each time to keep his balance. Sarah never looked back to check on him again and he set his jaw grimly. After a while, he realized what he was doing. He was pushing himself because *she* expected it of him. It was such a startling revelation that he stopped climbing for a moment and stared at her back. He admired the assurance with which she moved, the lithe grace and suppleness of the muscles. There were dark stains on her shirt, at the armpits and at the small of her back. He had been sent to bring Sarah in, for her own safety and that of the Associates; but it was working out the other way. Somehow, somewhere along the line, he had lost mastery of the situation, and he couldn't quite say where or how. Sarah was the kind of person who, once she had chosen her direction, couldn't help but draw others along with her. She was a quiet leader, the kind that competent people stood in line to follow.

Red wasn't sure how that sat with him. He never liked being subordinate. He liked being in charge. *Maybe that's why Sarah and I were so immediately* simpatico *when we met,* he thought. Kindred spirits always recognized each other. *Although I was never the kind of loner that Sarah seems to be. I like being part of a team. I like it when everything clicks together.*

He resumed climbing. Sarah's weakness, he decided, was that, while she gave help with no questions asked, she had a hard time accepting help. That could be dangerous. At crucial times, it was always better to have someone to watch your back.

Why is it that we've never been able to find a stable social order between the individual and the group? Between the loners and the yes-men. The pendulum keeps swinging from side to side, but doesn't spend much time in the middle. A social pendulum. He could envision the equations. He could even picture the equilibrium manifold. A simple pleat, or maybe a swallowtail. Not like some of the strange attractors they had to deal

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

with. Just shift the splitting parameter a bit and it would damp the cycle. The memes for it were there, in the cultural pattern. The very fact that he could imagine the possibility at all meant that they were part of his memetic heritage. All that was necessary was for the Associates to adopt it as a goal, then maintain a constancy of purpose for five friggin' generations. Piece of cake. Ha! It was *maintaining* the commitment that was hard. Like everything else in life, the Associates would change over the years.

"What does the P. stand for?" he asked impulsively.

Sarah stopped, turned, and gave him a puzzled look. "What?"

He took the advantage and caught up with her. "The P. Feline P. Cat."

"Oh. P as in Pussy. Feline, the Pussy Cat."

He winced. It figured. If she'd been a dog person, she would have called her pet Canine H. Dog.

The sound of a crack distracted him. He turned downslope.

"It's Crayle," Sarah told him.

Red could make out the gunman's figure at the bottom of the draw. He was firing uphill at them, but the shots were falling well short, making puffs of dust in the ground below them.

"Even a good marksman has a hard time firing up or down hill," Sarah commented, "but I'd rather not wait until he gets the range."

"He's only got a pistol," he pointed out.

"I'd rather not wait until he gets lucky, then."

Red grunted. She had a point. He watched the man reload his gun, holster it, and start up the draw after them. He wasn't giving up; but at least he'd need both hands to climb the rough spots. Still, when it came to Crayle, it was best not to make assumptions.

The rest of the climb was easier than the part they had just gone through and another half hour brought them out on the relatively flat area atop the mountain. The main peak rose another 300 feet on their left. The regular trail from Morrison lay to their right.

Red felt light-headed and dizzy. Nauseous. He stopped and squatted beside the trail. Sarah looked at him.

"What's wrong?"

"Don't know. I feel like I'm going to throw up."

"Mountain sickness," she told him. "If you're not used to the thin air, exerting yourself like we've been doing can bring it on."

"Great. What's the cure?"

"Live in Colorado for a year."

He gave her a sour look. She probably made jokes about seasickness, too. "Just give me a minute to catch my breath," he said.

She scanned the mountainside behind them. "It's a lot worse when you go up one of the really high mountains. You want to give Crayle a minute, too?"

"Hell no. He lives here. He's probably a mountain goat like you."

"Come on, then. The trail's for tourists. It can't be as bad as coming up the gulch."

"Yeah." He looked around. They were on a high ridge. Several peaks lay to their left and right, separated by draws where the runoff water ran down to the high plains. The ruins of a stone building peeked through the evergreens

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

to their west. The Walker Mansion, he thought. Falcon Castle. Then that peak over there on the right, about a mile away, must be where Walker started building the Summer White House, just before the First World War. He shook his head. Walker had been a man of dreams, a sentimentalist at heart.

Sarah dropped back and they walked the trail side by side. She pointed to the wreckage of the mansion. "He was quite a personality," she said. "Newspaperman and realtor, just like me."

Red smiled. "You as rich as he was?"

She laughed. "Not yet."

"He was a military adventurer, too; did you know that? He served in the Chinese army."

"Yes, I did know that," she replied. "But I read about him because we had some careers in common. How do you know about him?"

"Oh," he said vaguely, "I heard things here and there. How he proved the feasibility of dryland farming on his model Berkeley Farm; how he turned *Cosmopolitan* into a prestigious literary magazine by featuring writers like Crane and Wells and Tolstoy and Clemens; how he bought the Stanley Company to push steam-powered 'locomobiles.' "

Another half dozen strides and Sarah asked. "Was John Brisben Walker one of your people?"

Red stopped short. "What?"

Sarah kept walking and Red double-timed to catch up.

"And Ford and Edison and Firestone and Burroughs and Dewey and Taylor and, oh, dozens of others who changed or tried to change the course of history."

He grinned. "Why do you ask?"

"Because *you* seem to know a lot about Walker and . . . Dammit, Red, who don't you ever answer my questions?"

"Habit. All right, I'll answer you: Yes and No."

She twisted her lips. "Meaning some of the people I mentioned were members and some weren't. Okay. We don't have to get into that now. I just wondered how many of our modern problems were caused by your people."

Red grunted noncommittally. "Today's problems are often yesterday's solutions. Our grandparents prayed for what we condemn. Don't blame us for everything you don't like in life. We aren't that powerful. Besides, Utopian Research Associates doesn't tinker much anymore."

She gestured toward the mansion. "Even back then, at the turn of the century?"

"Even back then," he said. "Quinn laid down the rule. He felt we didn't know enough to make large scale changes without risking unacceptable side effects. Observe and study. Those were his watchwords. Over the years, they became 'Observe and study and make investments.' " He grimaced. "Not everyone liked the rule. Not everyone went along with it. But Quinn had strong, personal reasons for it; and the Associates have never taken concerted group action." He wondered if Sarah would be the one to do it. He grinned. Cam Betancourt and the other Council members were in for a big surprise if they managed to recruit her.

"None at all?"

He shrugged. "A few minor adjust-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ments here and there, to maximize ROI."

"Hunh. Sometimes running doesn't work, either. Doing nothing is also a choice."

He was surprised to hear his own words coming back at him. "Are you trying to tell me something?"

"I think some members of the Associates want to start tinkering again."

"Oh? Who, for instance?"

She snorted. "Don't be coy," she told him. "You're one of them. One of the tinkerers."

He grinned at her. "Is it that obvious? I told you, a tinker is someone who fixes things that are broken."

They had reached the ruins. Walker's house had been struck by lightning in 1918. It had burned and Walker, disillusioned, penniless, and heartbroken by his wife's death two years earlier, had never rebuilt. All that was left now were the stone walls, broken and gaping, with the tall chimney towering above, still improbably intact. A split rail fence surrounded the ruins.

The building was laid out in a U-shape, with the open courtyard facing roughly southwest. The chimney was at the northeast corner. They walked around the south wing to the courtyard. There was a signboard there for the tourists, telling all about Walker and his "Castle" and the summer White House he had started to build with pennies pledged by the schoolchildren of Colorado. Red ignored it and walked past into the courtyard. He surveyed the ruins. A fair defensive position. He'd been under worse cover that time in Jacksonville.

"Let's get behind the wall," he told Sarah. "It's too exposed out here." There was no point in going further west. The area there was too open and flat. Crayle would catch them with no shelter.

The wall before them had a doorway flanked by two windows. On their left was another wall, its middle section almost entirely tumbled down. They climbed the fence and ducked through the doorway. Red went immediately to the left-hand window and, standing off to one side, he studied their past route. He unzipped his coveralls so he could reach his gun quickly; but he didn't take it out in case ordinary tourists approached.

He scanned the trees to the east. He could see the plains beyond the mountain rim, where they stretched in perfect flatness to meet the sky. There was no sign of Crayle. That worried him nearly as much as seeing him would have. With Crayle, either way was bad news.

There was no sign of Janie, either; and he checked his watch. They were early. He wished she would hurry up and get here.

He glanced around their surroundings. The remnants of walls, about waist-high, showed where the different wings had been. Faded scorch marks discolored some of the stonework. It was all broken up. He couldn't tell what the original floorplan had been. "Why did you say that? About the tinkering, I mean."

Sarah squatted against the wall and shrugged out of her backpack. She took Fee from his special pocket and scratched his head. The cat narrowed his eyes in pleasure. "I don't know. The way you talk. Your body language. You want to

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

change things. You don't like sitting back and getting rich off of other folks' miseries."

"The getting rich part is okay; and folks will be miserable anyhow. But you're right. It's past time the Associates stopped being so gun-shy. Wild rivers only seem like a good thing if you don't live downstream."

"But if you dam the river to help the folks downstream, you'll flood the folks upstream."

"With the river of history, we've no choice. Like it or not, we're all going to be living downstream."

"Don't play semantic games. You know what I mean."

He shrugged. "Sure I do. But that's my whole point. If I dam the river, I flood the folks upstream. If I *don't* dam the river, then it's the downstream folks who get flooded. It's a question of which is best for the *whole* group, not either of the subgroups. Besides, you can't make an omelette without breaking eggs."

"Spoken like a chef. What if you're one of the eggs instead? That whole bit about the good of the group . . . What about the rights of the individual? Is the group free to trample on them?"

He looked at her. "Would you sacrifice the prosperity of the group to the whims of the individuals? What were Typhoid Mary's rights?"

"That's a loaded question!"

"What good is an unloaded one?" he snapped. He chewed his lip and resumed his vigil. "Maybe it'll make you think."

"Maybe. Shouldn't it make you think, as well?"

He grunted. "Let's not quarrel. We both have the same enemy; only we look at her in different ways. To you, the Society's manipulations deny the rights of individuals. And because of that, you don't see much difference between Them and Us. To me, it looks the opposite. They are the individuals, maximizing Their own gain, and in the process suboptimizing the group. No," he shook his head. "It's not the group that the individual should fear. It's other individuals."

"But . . ."

"Go back to our river. The rights of the individuals upstream 'trample' on the rights of those downstream; and vice versa. Whose rights take precedence? To dam or not to dam. Whose lives will be disrupted?"

"It's the intent," she said. "No one likes to see lives disrupted if they can help it, but somehow it's easier to accept when they're disrupted by an act of nature rather than by human intervention."

"Let's not get back onto that. When you're dealing with culture, what's natural and what's human intervention is a moot point. Ninety-nine percent of you are constantly making changes, but haphazardly, with no idea of the long term or of side effects beyond your immediate needs and interests. A few advertisers, preachers and the like, have a vague grasp of some principles. But you're blind. All of you. We . . . Well, sometimes we don't see things so clearly either. But," he grinned at her. "In the country of the blind, the one-eyed man is king."

She shook her head. "I still don't like it."

He stifled a spasm of annoyance.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Why couldn't she see it? Was she too thick-headed? Or his arguments too weak? He turned his back on her and concentrated on his vigil.

"Tell me," she said after a moment or two. "If Quinn set up a nonintervention rule, why are you so eager to convince me otherwise?"

"Isn't that obvious? I want you on my team. Help me get the Associates off their *laissez-faire* duffs. Shake them up."

She stared at him. "Are you kidding? I'm against everything you're for. I think your methods are despicable. The whole concept is repulsive."

He grinned. "Wouldn't you say that makes you the ideal recruit? The last kind of person I'd want in the Associates is one who enjoyed the power."

Sarah opened her mouth to say something, then appeared to change her mind. "I don't get you, Red. One minute you talk like you want to free the puppets; the next minute, like you want to be a puppeteer. What are you up to? And don't hand me any riddles."

"It's simple. Or at least it seems simple to me. They're already pulling the puppet strings. Someone's got to stop Them."

"What are They doing?" asked Sarah.

"They're trying to breed a nation of technopeasants. Educated just enough to keep things going, but not enough to ask tough questions. They encourage any meme that downplays thoughtful analysis or encourages docility or self-indulgence or uniformity. In what other society do people use 'smart' and 'wise' as insults? We tell people 'don't get smart.' Those who try, those who really like to learn, we call 'nerds.' Look at television or the press or the trivia that passes for political debate. When a candidate *does* try to talk about the issues, the newspapers talk about his sex life. Look at Saturday morning cartoon shows. Peasants, whether they're tilling fields or stuffing circuit boards, are easier to manipulate. Don't question; just believe. Turn off your computer and Trust the Force."

She grunted. "Or turn your computer on and treat it like the Oracle of Delphi."

"That's right. They've made education superficial and specialized. Science classes for arts majors? Forget it! And how many business or engineering students get a really good grounding in the humanities? When did universities become little more than white collar vocational schools?"

"It seems shortsighted to me."

"It is. They're setting us up for a collapse in about a hundred and twenty years. That's why we've got to stop Them. I've seen the equations." As always, he felt a dull ache of anger when he thought about it. It was anger directed not only against Them, but against Cam and the other Associates, who did nothing, using Quinn's nonintervention rule to cop out. "But, for the first time in history," he continued, "the old Society is run by people who just don't give a damn beyond their own lifetimes. Even Grosvenor Weil, to give the old devil his due, had the long-term perspective. He wanted his children and grandchildren to live well. Genevieve? She has no children."

"The Dewey system of reading?"

He nodded. "You catch on fast. That's another meme They encourage.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Borderline literacy can be very useful, from Their point of view. Did you know that most people firmly believe that the whole-word method is *newer* than the phonics method? And there's a powerful meme in our culture that says 'Newer is Better.' See how They can exploit the connections? How one meme reinforces another?"

"My architect and I were talking about it not too long ago." She paused and swallowed. "God, it seems like another planet! Red, what happened to Dennis?"

Red searched her face and saw the pain there. "It wasn't your fault," he told her. "It was nobody's fault."

"Do you think They . . ."

"I don't know. The phone message said that he had vanished completely, even from the hospital records." He scowled. "That doesn't make sense. It would have been easier to short circuit one of his life support units. Or even start a fire in the hospital."

She shivered. "They're vicious," she said. "Evil."

"That's why we have to stop Them. We have to start spreading anti-memes."

"Fight fire with fire?" she said.

"Don't be cynical. Have you ever fought a forest fire? Sometimes a backfire is the only way to stop one."

She shook her head violently. "No! You say They've attached puppet strings to us and They're pulling us the wrong way. But your only answer is to attach another set of strings!"

"What would you do?"

"Cut the strings. All of them."

He grinned at her. "Have you ever seen a puppet without strings?"

"Yes. Pinocchio."

He blinked, startled by her answer. Metaphor was always suspect; but frequently it was insightful as well. Almost, he could see what her remark might mean; how to translate it into action.

"Don't sell the puppets short," she said with acid in her voice, and Red was sorry he had ever used that puppet image. "Some of us can fight back, you know. We're not helpless."

He looked away from the window at her, and an uneasy feeling stole over him. "What do you mean?"

"I mean last night I built one doozy of a worm."

He listened, appalled, as Sarah described her program. A program that would scramble Their files? Was she serious? More importantly, could she pull it off? He wasn't sure. She certainly talked like a hacker, and Kennison's system was probably vulnerable. Even the best defenses grow lax when they've never been attacked. But that would mean . . .

"Oh, shit."

"What?"

"Your worm. It'll attack our files, too."

"Red? Try to imagine how little I care."

"Yeah." He looked at her. "You don't give a tinker's dam, do you?"

He looked out at the forest again. Maybe it wasn't as bad as it sounded. Everything was copied on hard storage. That was an elementary precaution. Kennison, on the other side, he would know that, too. Still, we'll both lose current information. Everything since the last save. And it'll take weeks,

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

maybe months, to rebuild our systems. But . . . *Whoops*.

"Sarah? Your worm will be living in the Net from now on, won't it?"

"Until someone finds it and kills it."

That tore it, then. Even after the systems were rebuilt, the worm would still be there, ready to attack again as soon as they hooked into the Net. Both organizations had encouraged computers and data processing; and had carefully planted and nurtured the memes for a national data network. It had made their own intelligence gathering so much easier. Not like the old days, when Quinn and the others had to scrounge around in the Census Bureau, paging through hand ledgers. How ironic that they had both become vulnerable through the same technology. There had to be a defense, a way around the problem. *But for the foreseeable future, we're both cut off from our lifeblood—information.* It was like someone turning off the lights. *Without the information we get from the Net, we're as blind as everyone else.*

He wondered about his own secret system. He was parasiting off the Associates' system and not tapping directly into the Net. Would he be immune to her worm? Maybe he could turn this whole thing to his advantage. He grinned at Sarah. An electronic minuteman. Minute-person? When a technology is new and expensive, it usually benefits those in power; but when it becomes simple, reliable, and well enough understood by the masses, it becomes liberating. Kings had been faced with rabble before; but at Lexington and the Bastille, they were faced with a rabble in arms. Now, the electronic weapons were beginning to diffuse through the population. Red began to see a new strategy more clearly. The Pinocchio strategy, he thought wryly.

They were silent for a while, thinking their own thoughts. "You don't seem too upset," Sarah said.

It wasn't good to stay in the same place too long. Red crouched and crawled to another vantage point. "No. I guess I'm just an anarchist at heart. Besides. Millions of people making millions of decisions are easier to predict statistically than small elite groups."

She shifted to a more comfortable position and drew patterns in the dirt with her finger. "Tell me, how do you know what Their plans are? What memes They're spreading. They don't call you up and tell you."

He laughed. "No, They don't. And it's not a matter of what I like or dislike. We can't blame Them for every bad thing that happens. Some of the memes They're spreading, I like. And, in fact, not everyone over on that side is bad. A lot of the rank and file have no idea what Genevieve and the others are doing." He sighed. "Life would be simpler if everything were black or white."

"Like us? We're black and white, you and I."

He looked at her, surprised. She smiled at him, teeth white against the dark face. There was no fear there. He hadn't expected any. He smiled back. She was beyond fear. "Well, I wouldn't say our lives were exactly simple." He looked back out at the forest. Crayle had not yet made his appearance. That was trouble, because by now he *should* have.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The back of his neck prickled. *Where was he?*

He took his gun from its holster. He didn't think any tourists were going to show up. "They leave 'fingerprints,' " he continued for want of anything else to say. "Directed behaviors create statistical anomalies in the data. We've analyzed the anomalies and found a . . . a cluster, I guess you'd say, that we can relate to Their goals."

"Orthogonal factor analysis."

"Yes." He was surprised. "How did you know?"

"Oh, it's old hat. Carson and Quinn were doing it a century ago. Remember that worksheet I told you about? The one Dennis French had? It said 'try orthogonal factor analysis' and the various entries were numbered one, two, or three, so we assumed, Dennis and I, that . . ."

He jerked his head up, stunned. "What? *Three?* Are you sure?"

"Why, yes. Is that important?"

He turned and opened his mouth to answer her, but the words never came out.

Sarah watched with horror as Red pitched backward against the stone wall. He slammed against it and fell forward on his face. Behind him a red splash decorated the stones. He didn't move. The whisper of the muffled shot echoed in the ruins.

A low, partial wall ran at right angles to the wall with the doorway in it, and Sarah hugged the ground behind it. The smell of the dirt was heavy in her nostrils. From the way Red had fallen, the shot must have come from the northwest. Crayle had apparently worked his way through the trees behind them while they had been watching the east.

Now she was trapped. Red had the only gun and he had fallen on top of it. Besides, his body was almost certainly within Crayle's field of fire. She looked behind her. Could she crawl out without being seen? Not through the door, that was exposed, but through another break in the masonry? Maybe, maybe not. But it was better than lying here and waiting for a bullet. She began to inch backward until her boots touched the wall. She probed back and forth with her feet, searching for a hole.

Yes. There was another way out. It was small, but she thought she could fit. She pushed herself into the hole feet first, pulling her pack after her. Fee sat curiously atop it, like a king being borne on a processional float. *I wonder what he thinks of these antics.* Her squirming had pulled her jacket and shirt up and stones ground into her stomach and ribs. She tried not to think about getting stuck halfway through.

Her hips gave her a bad moment. For a moment, she couldn't move. She bit on her lower lip. Then she pushed as hard as she could and came free. A stone raked her ribs on the left side and she stifled a cry of pain.

Finally, she was through. She gasped, rolled to the side and sat with her back to the wall. She felt her side where the stone had cut her and her hand came away bloody. No time to relax, she thought. Crayle was coming.

She glanced at the doorway to her right. Red was partly visible through it. She wondered if he were dead, or just unconscious. It had all happened so fast, but she thought he had been hit in the

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

shoulder. She studied his muscles. In art class, she had learned what the body looked like in life and death. A dead man did not lie like a sleeping or unconscious one. All opposing muscle groups should be equally relaxed.

The sphincters relaxed, too; but she couldn't see his pants from where she sat. She took a deep breath, but she couldn't smell anything, either.

She opened her pack and dug inside. She came out with a mirror and her hunting knife. "Come on, Fee," she whispered.

Crouching, she ran to the corner of the ruins, keeping a tall wall between her and where she thought Crayle was. There she lay flat again and cautiously pushed the mirror out beyond the edge. She was careful to keep it in the shadow of the wall so it wouldn't reflect the evening sun. She tilted it this way and that, viewing the "inside" of the ruins.

She could see the low wall that she had lain behind. Red was beyond it, on the other side; but she couldn't see him.

There! She saw the reflection of a man approaching the ruin. She backed away from the corner, keeping the mirror in view. It was Crayle, just as she remembered him from the library. When he reached the wall, he swung his gun over, holding it in two hands. Then, seeing there was no one there, he ducked back, his eyes darting.

She saw him go around the backside of the building and smiled, because that meant Crayle couldn't read sign. The drag marks in the dirt showed clearly which way she had gone. Sarah edged around the corner. She left her mirror in place, but turned it so it now reflected the "outside" wall where she had just been.

She saw Crayle jump out with his gun aimed straight down the wall. Again, there was a moment of hesitation while he took in the empty scene. Then he let the gun drop and looked around.

"I know you're around somewhere, little lady." Pause. "Don't make this hard on yourself. We only want to question you."

Incredibly, Sarah found she had to suppress a giggle. How stupid did he think she was?

She watched him in the mirror as he walked toward her position. *When he reaches the doorway*, she thought, *he'll jump back through to this side.* It was an obvious gambit to try. She readied herself to jump around the end of the wall at the same time. *And what if he doesn't do it?* She swallowed and watched his feet carefully. A man about to jump holds himself a certain way.

Yes. He jumped and Sarah jumped at the same time. Her heart was pounding at this cat and mouse game, but she felt strangely exhilarated, as if she were somehow more alive. Every sense seemed stretched to the limit. She could hear Crayle's shoes where they crunched the gravel.

This can't go on forever. I'll have to do something. How long 'til sundown? She knew these hills. In the dark she might be able to escape. Crayle was not a woodsman.

She kept her eyes glued to the mirror, not daring to glance away even to check the sun. It felt strange knowing that she actually had her back to Crayle. Fee crept up to her and rubbed against her

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

calf. Fee. Maybe he could help. She blocked out a plan in her mind.

"It's no use, little lady. You're all alone up here and I'll get you sooner or later. Just like I got your friends. You should have heard him beg for his life."

He had to mean Abbot. She couldn't imagine Morgan or Dennis begging.

Her plan had an element of the desperate in it. Crayle was a professional and it wouldn't be easy to trick him. But he thought he was dealing with an amateur—witness his attempts to get her to talk and reveal her position—and that gave her an edge. She pulled the hunting knife from its scabbard, and taking a deep breath, picked Fee up. "Forgive me, Fee," she whispered.

"And once I've taken care of you," said Crayle, "I'll head back to Denver and finish the job on your queer friend."

Turning her back on the mirror, she *tossed* Fee underhanded as far as she could along the outside wall. Fee, terrified and astonished, squealed and landed with a crash, and ran into the trees, scattering leaves and twigs.

Sarah jumped to her right with her knife cocked for throwing. She saw Crayle thirty feet away staring through the window hole in the direction of her cat. He was aiming his pistol out the window, but her movement must have caught the corner of his eye because he turned back to face her just as she threw.

It was a blur of motion. The knife buried itself at the base of his throat. Crayle staggered and arterial blood spurted from the wound. His right hand made an abortive motion toward the handle and his left tightened convulsively on the pistol. The gun went off and sparks ricocheted across the stones. A look of infinite surprise crossed his features. He dropped the gun and collapsed like a deflated balloon.

She started to run toward him, but hesitated. Don't take Crayle for granted. She approached cautiously, ready to bolt for cover.

Crayle lay on the ground next to Red, his legs kicking in jerks. He turned his eyes toward her in what looked like disbelief. Then they filmed over and he sagged and was still.

Sarah began shaking and her knees felt weak. She sat on her haunches and covered her face with her hands. It was over. She sobbed and tears ran down her cheeks, leaving muddy trails in the dirt there.

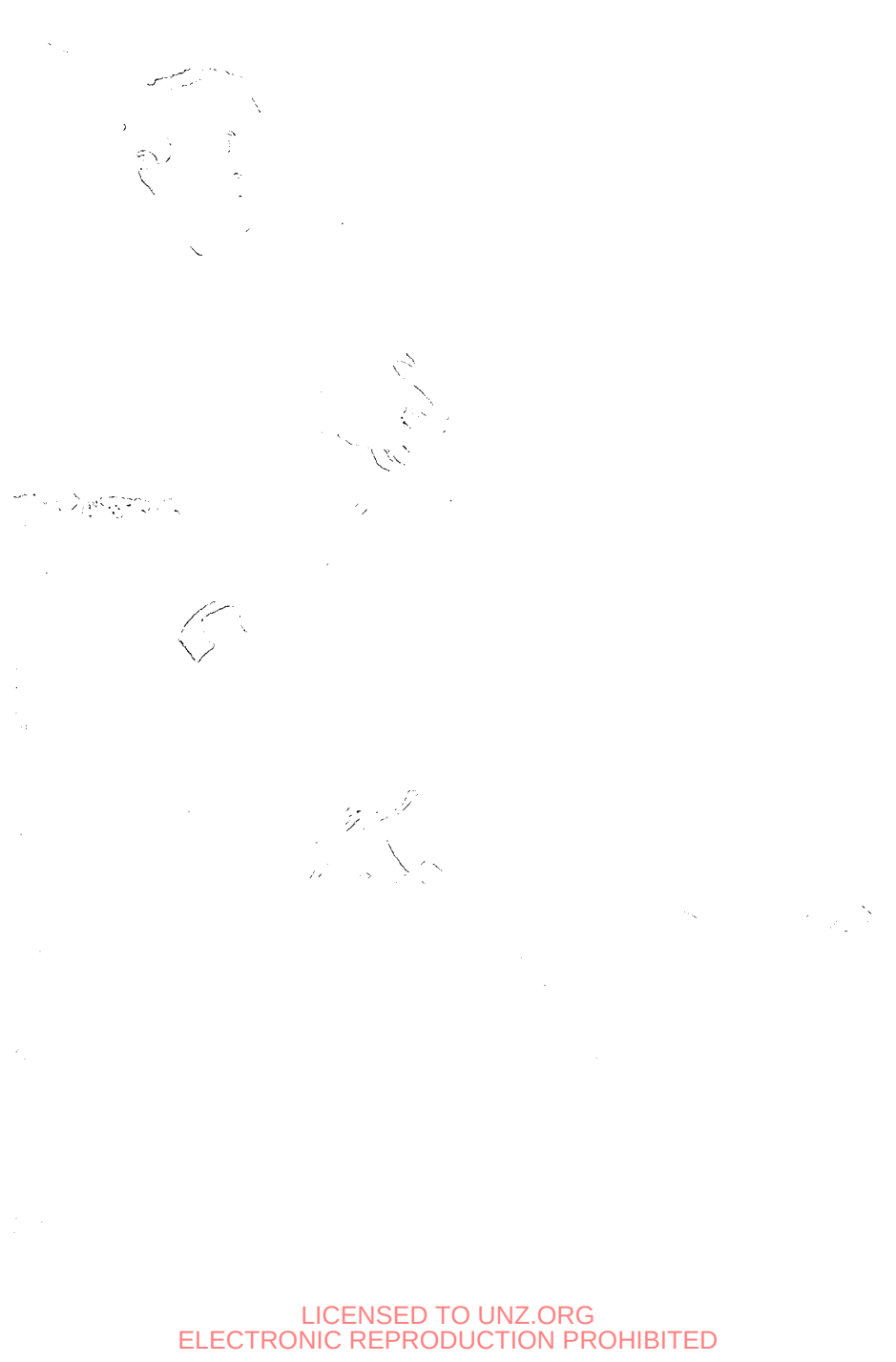
How could you explain someone like Crayle? A man empty and vicious. Yet, once upon a time he had been child, with a child's innocence; and surely his parents had never thought he would come to this. He had suckled and played with his toes. He had delighted his parents with his hesitant first steps. Now he was dead. Where along his path from toddler to corpse had the soul leaked out of him?

On hands and knees, she crawled past Crayle to where Red lay. She felt his throat for a pulse. Was there one? She thought she could feel something, but that might only be her imagination. "Oh, Red," she sighed sadly.

There was a sharp click behind her and she whipped around. A spare, older woman stood there, dressed in denim with a telescopic rifle cradled in her left arm. "Nice work, missy," she said.

There was something familiar about her windburned face. For a moment, she couldn't place her. Then she remem-

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

bered. "You! You were in the library with Crayle!"

"Yup." She walked over and stared at Crayle's face. "He sure looks surprised. Can't say I blame him. It's always supposed to be the other one. His kind never think it's going to be themselves that git it." She looked at Sarah. "'Specially not from the likes o' you, missy. I'm a mite surprised myself."

"You're . . ." Sarah stood up and stared at her. 'You're Jane Hatch!"

She nodded, still looking at Crayle. "How's Malone? He gonna make it?"

"How long have you been watching?"

She shrugged and spat tobacco. "Long enough. You're one cool lady. Most folks would've been paralyzed with fear." She put her rifle aside and knelt over Red. Her hands probed expertly. "Shoulder wound," she said. "And concussion. He must've hit his head against the wall. Good thing his skull's so thick."

"How long have you been watching!"

Janie turned and looked at her. In her calm eyes, Sarah thought she could see more than a touch of Crayle's eyes. A detachment. A distancing from the world around her. "Why d'you want to know, missy?"

Sarah pointed at the rifle with the telescopic sights. "You could have shot him, couldn't you? But you let him stalk me like an animal! What's wrong with you?"

Janie shook her head. "It's nature's way, missy. We don't interfere. It's always up t' the bird whether the snake strikes it or not."

All during her conversations with Red, Sarah had thought that trying to guide the course of history took supreme arrogance. Now she saw that the opposite was also true. There was something equally arrogant in those who stood by and watched and did nothing.

She turned her back on Janie, her arms straight down at her sides, eyes and fists clenched shut. The tears on her cheeks felt hot. It had to end. There had to be a finish of it. The Society and the Associates both. She hated them. She hated their secrecy, their callousness. Even their good intentions were callous, impersonal.

Her worm would start it. Crippling their data banks would throw both of them into confusion. Maybe give her time to think. And the worm had a stinger, too. A codicil that she hoped would shatter their smug little world forever.

When you know someone's deadly secret, there was only one way to be safe. Tell everyone. If it weren't secret anymore, there'd be no point in singling her out. So she had instructed her worm to copy whatever it found and download it anonymously into every TV network, newspaper, police, and government system it could find. And that included downloading Morgan's files, as well.

She knew that both organizations had heavily infiltrated the various information and intelligence groups. They were rich, powerful, and they'd do everything they could to ridicule and silence the truth. And maybe they could, this time, but Sarah didn't think so. The facts would be dispersed too widely; too many of them could be verified independently; and, ultimately, the two societies must be too small to block every

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

possible avenue. Otherwise, they could not have kept themselves secret for so long. Perhaps millions would scoff; but millions would believe.

It would be, as Red had claimed, interesting times.

You can never do just one thing. Red had said that, too. Along with blocking their selfish machinations, she would also be blocking whatever good they could do. The Founders had ended slavery, had forestalled an atomic war. Red had intended to block the Society's attempts to create a Docile Society. Noble goals, every one. Was she right to sabotage that?

She didn't know. Was secrecy really necessary? If the equations were truly compelling, verified by successful prediction, open debate and discussion should lead to wider consensus on the proper course of action. Perhaps the early Society had made so many errors because the thinking had been so inbred. Something like the genetic drift that took place in small populations must have occurred.

Time enough tomorrow to worry about that. And to worry about the other loose ends that puzzled her. What was the Q-file that Morgan had already copied his data into? Why had Red been so startled by the fact that Dennis's list had been split into three subsets? And what had happened to Dennis? From the way that Crayle had talked, she believed he hadn't known anything about the architect's disappearance.

She walked to Crayle's body and stared down at it. She suppressed a feeling of revulsion, knelt on one knee, and pulled her knife from his throat. His unfocused eyes stared at her and she looked away. *The second time will be easier,* said a voice inside her head. Crayle's ghost? There wouldn't be a second time, she vowed. Not if she could help it.

She looked up. It was growing dusk. Janie had picked up her rifle. "I'm goin down t' the pickup to git my first aid kit. Why don't you come along? You can sit and wait in the cab 'till I'm ready t' carry him down."

Sarah stabbed the knife into the ground to wipe the blood off the blade. Red would recover. She was glad. She didn't agree with him; at least, not entirely; but she was glad he'd be around to argue with. There was more than a touch of Morgan in the man. "No. Thanks," she said. She stood up and stuck the knife through her belt. "I've got something else I've got to do."

She walked through the broken doorway to the outside and climbed back over the fence. She squinted her eyes at the gathering gloom. The trees were tall and black and the wind ran through their needles with the sound of a distant crowd. *I had to do it,* she thought. *He'll understand.* She faced the brush and squatted.

"Fee?" she called into the night. "Fee? Come back. I need you." ■

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE REFERENCE LIBRARY

Continued from page 135

ger's in *When Gravity Fails*) is doomed to inadequacy—especially since his story centers on the users of the technology, not the technology itself.

The story opens as Rebel Elizabeth Mudlark awakens in the hospital. She escapes, and she soon learns that she is property because she is really someone else: Eucrasia Walsh, a persona bum who, while testing a new wetware personality, decided she preferred being Ms. Mudlark, and trashed the master copy of the wetware. Rebel will remain property until the corporation that owns the Mudlark persona can recopy it from her skull.

With a little help from new friends, including a lover whose skull contains four distinct personalities, she avoids assassins and flees into the jungle of Solar System civilization. As she flees, she shows us slums, wetware terrorists, cops who can instantly program bystanders into more cops, thus expanding their numbers and efficacy. She shows us social experiments, grandiose dreams, and finally Earth itself. She learns that the Mudlark persona was stripped from the brain of a mysterious corpse, and in due time she learns that that corpse had been a courier. But the Mudlark and Walsh personae are integrating, and now she has inherited the mission of the original Mudlark.

Rebel Elizabeth Mudlark proves to deserve her name. She is indeed a pattern-breaker whose song arises from the muck. When she is done, human civilization has changed in some very fundamental ways, some clearly good, some worrisome, and one suggesting a Gibsonian renaissance.

I enjoyed it. My patience with high-tech down-and-dirty is growing strained, but Swanwick is a skillful writer with a warm sense of his characters and the ability to see conventions—even new conventions—in new ways. He even has a sense of humor, though perhaps not of Tymbrini caliber.

With her last book, *Twisting the Rope*, R. A. MacAvoy stumbled into the trap that awaits all authors of successful novels. They are urged by readers and agents and editors—please!—to write another just like the first, or a sequel or two. Sometimes it works. Sometimes, as then, it doesn't. But MacAvoy is clearly not one to give up. Nor has she exhausted the originality and charm that make her such a delight at her best, as with the *Damiano* trilogy, or *Tea with the Black Dragon*. And she does indeed hold more stories in which legend steps down to walk the Earth, and humanity is the better for the encounter.

No, **The Grey Horse** is not just like *Damiano* or *Tea*. But it does deal with similar material to similar effect. Here we have again the Ireland that occupied MacAvoy in *The Book of Kells*, but a different Ireland, an Ireland of English oppression and rebel boyos. An aged horse trainer meets upon the road an unusually noble example of the local breed of horses. A stallion, it invites him to ride, accompanies him home, and moves into his barn. And when, later, the old man decides to geld the fellow, he learns it is really a puca, a being who can shift in form from horse to man, screeching in incipient falsetto, "Waaiit a minute!"

According to the tales I've heard, a puca is a mischief-maker. Not so Rory MacEever, out of Wind by Granite. He has come to court a human lass who bears the blood of faerie. To do so, he needs legitimacy in the human community, and he will gain that by serving the horse trainer as a groom.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Does it sound a slight tale? Add in the return of the wastrel son, a nationalist priest, a risky baptism, an invasion of British troops looking for terrorists, a sympathetic landlord, and a grand Irish sense of commitment to the land and its people, and we have a warmly absorbing tale of love and loyalty.

We have, in fact, MacAvoy's best novel to date. Don't miss it.

Some time ago, Justin Leiber told me that the publisher of his first novel, *Beyond Rejection*, turned down the sequel. It just wasn't the same kind of action yarn. And being a sequel, it didn't appeal to other publishers who hadn't had anything to do with the original book.

So it languished on the Leiber shelf while he wrote two more action yarns. And eventually Justin reworked that sequel so that it stood more effectively alone. Or the publishers forgot that there had ever been a prequel and recognized that in fact **Beyond Humanity** does stand alone. And now we have it.

And it's true—*Beyond Humanity* is not an action yarn. Justin gives us a humanity that has survived an anti-science, anti-intellectual, humanity-first period in which it destroyed the last of the great apes and banned computers. Now sanity has returned. So have computers. There is a chimp, Go-Go, cloned from a frozen corpse. There is Golem, a sentient program loose in the hospital wiring. There are the hero of *Beyond Rejection*, Sally Forth, that man in a woman's body, with tail, and her friend Candy Darling, age 90 in an age 12 body. And they have a mission: Humanity is restricted to that small segment of the galaxy available through the local wormhole network, but perhaps, just perhaps, there is a way to communicate with the aliens beyond the network, if only Our Heroes can finagle permission to try sending a message.

Yes, *Beyond Humanity* does stand alone. As novels go, it is passable. It has interesting characters with an interesting problem and Justin, who is a philosopher in real life, has some interesting things to say about intelligence, xenophobia, and communication. Yet there are two major weaknesses. The story is largely predictable, and Justin fails to make the shift from the initial introduction of characters and background as smoothly as he should.

In 1984, I called Robert Sheckley's last novel, *Dramocles*, "the rankest bilgewater." He has improved, and he shows us just how much with **Victim Prime**, in which he returns to the world of his classic *Tenth Victim*. The date is somewhat later, when the culture of the Hunt is restricted to a single Caribbean island, and ecocatastrophe has left the U.S. in ruins. From these ruins comes Harold Erdman, on a mission to hunt, earn money, and send enough home to help his town survive the coming winter. And he does precisely that, aided by colossal coincidences, the incompetences of villains, and the manipulations of the author.

Yes, Sheckley has improved. But he has a long way to go to recapture his old hold on the reading public. Though his hero wades through gore to reach the story's end and though Sheckley shows traces of his old satiric wit, *Victim Prime* is a bloody bore. The gore is gratuitous. The satire is obtrusive and unfunny, largely because it fails in its obligation to attack something that has not been torn to shreds long ago. The characters are plastic. And the plot is mechanical.

For mathenuts only is Rudy Rucker's

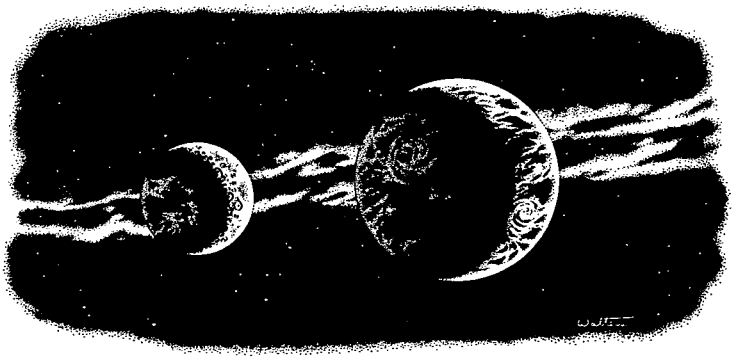
LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Mathenauts: Tales of Mathematical Wonder. Here we have Rucker himself, Isaac Asimov, Ruth Berman, Anatoly Dnieprov, Norman Kagan, Martin Gardner, Ian Watson, George Zebrowski, Douglas Hofstadter, Larry Niven, Robert Sheckley, Frederik Pohl, Gregory Benford, and more playing mathematical games. The individual stories are often very nice in an antique, Golden-Age way. Here the gimmick is everything. Characters, style, and point are—let me be kind—secondary, and in an age when we expect something better from science fiction, the book quickly grows tiresome.

I haven't read them lately, but I hesitate not a bit to call to your attention Signet's reissues of Arthur C. Clarke novels and collections. I have in front of me **A Fall of Moondust, The Sands of Mars, The Wind from the Sun**, and **The Nine Billion Names of God**, and later this year we will see **The Deep Range, The City and the Stars, Islands in the Sky, The Other Side of the Sky, Tales of Ten Worlds**, and **Glide Path**. Each one will have a new introduction by Clarke, discussing, says the Signet press release, "the technological and theoretical innovations that have taken place since original publication and . . . how these innovations relate to the subject matter of each book."

A beautiful occasion to fill in any blanks in your collection and to entice new readers to our favorite genre, and to one of our favorite authors.

Nor have I read **The Jaguar Hunter**, Arkham House's collection of Lucius Shepard's fine stories (mostly novelettes). However, I have read enough of its eleven stories—from the title story through "Black Coral" and "Mengele" to "A Spanish Lesson"—to let me call it a marvelous volume, and one well worth adding to your collection. The highly laudatory introduction is by Michael Bishop; the illustrations are by Jeffrey K. Potter. ■



LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

brass tacks

Dear Doctor Schmidt:

The last few years have seen the death of several well known SF authors. We will lose many more in the next few years—but *our loss need not be permanent*.

A better understanding of advancing technology has led to the conclusion that aging and other causes of death can and will be licked at the molecular level. Not only will the people alive at that time be restored to perfect health (if they want it) but the same technology can revive a person who has been placed in "biostasis," where the information to reconstruct their brain to its former memories and personality has been saved. There is a very thorough discussion of the capabilities (and limits) of this technology (nanotechnology and cell repair machines) in *Engines of Creation,* by K. Eric Drexler (Doubleday 1986).

I think we should seriously consider the present-day implication of what nanotechnology means for SF fans and the older authors. Many of us will get to the era of this technology just by living, but some may need help. Reasonable extrapolations of developments leading to cell repair machines indicate that if you make it another 20-30 years, you are very likely to go on as long as you wish. Barring accidents or other bad luck, those under 30 have a good chance to see the far side of the Galaxy.

But even for those who won't make it to that time, the benefits of this future technology are open to anyone alive today through cryonic suspension.

Cryonic suspension grew out of the observation that mammal cells can be frozen with cryoprotective agents and most of them will survive thawing. I have personally known about cryonics for over 20 years, and up till a few years ago just dismissed it. I remember using the analogy that fixing the freezing damage would be like unboiling an egg. But given smart cell repair machines, unboiling an egg (unlinking and restoring denatured proteins) would be no harder than fixing a slightly scrambled document with a good spelling checker.

Freezing damage almost certainly does not scramble structure (brain cells and their interconnections) so badly that we cannot infer the original state. Current cryonics practice preserves the finest details that can be seen with electron microscopes.

And what is current cryonics practice? To get the best, you need to be dying of some clearly terminal condition in a cooperative hospital with cryonics personnel standing by. Not everyone manages such a clean exit, but if you can be processed within a few hours of death, that may be good enough. It takes several hours at room temperature before brain microstructure starts breaking down.

After a doctor has pronounced the patient legally dead, he (or she) is connected to a heart/lung machine, cooled, and administered drugs that inhibit blood clotting and brain edema. The patient is packed in ice and maintained on artificial circulation until brain metabolism is almost stopped. Then his blood is replaced by a synthetic plasma, which is slowly diluted with a cryoprotective

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

solution. The patient is cooled with dry ice, slowly cooled to liquid nitrogen temperature, and stored under liquid nitrogen.

There are two options of how much you save: whole body preservation and neuropreservation (head only). Every cell has instructions for building a new body, and going "head only" reduces the storage cost by more than a factor of 10.

There are now two significant organizations that have a total of 11 people in long-term storage. Fewer than 200 are signed up for biostasis, an amazingly small number when you consider that a large fraction of the general population and almost all fans know that this option is available.

I think there are three reasons so few have taken this course. The first is the most important. Death, especially your own, is hard to think about. We all have defensive mental mechanisms that have evolved to keep us sane. Unfortunately, these mechanisms make it difficult for us to take the necessary steps if we want to have a chance at the future. Developing social support structures or mutual support groups would help.

A second reason is that, until very recently, no one could say how the freezing damage or the original cause of death could be repaired. Drexler's book provides clear answers to those objections. I can't fault anyone for taking a long time to get used to the idea, but if you wait too long, your health may make it impossible to fund your biostasis with insurance.

The least significant factor is cost, at least for young healthy people. The cryonics organizations require at least $35,000 ($100k for whole body) to pay for liquid nitrogen and related care out of interest without touching the principal. They don't know how long it will take for technology to catch up with the needs of those suspended, so they assume the worst case. They have found that month-by-month payments by relatives don't work, and they won't accept these cases.

Most of those who have made arrangements for cryonic suspension have funded it with insurance. At my age (43) the cost for enough whole life insurance for my family is about $75 a month. A student at age 20, and in good health, could get away with as little as $200 a year.

Insurance funding is impossible or very expensive for those in poor health or well along in age. Some of the old masters are quite well off; others range down to church mouse status. Being a good writer and a good money manager are unrelated talents.

Raising money for suspension is one place where SF fandom could be a great positive force in saving the software of the old masters still living. About a third of fans at a Worldcon are willing to spring for at least the equivalent of a hardbound book if it would save one of the old masters. The easy part is raising money. The hard part is convincing them to cooperate with going into the future.

SF authors have had more influence on many of us than our parents. Do fans have any influence over the SF authors? Letters and petitions haven't worked. One of my friends has a letter to Miss Manners asking her suggestion. I would love to hear any new ideas. It might help if a lot of us set a good example by signing up. If enough of us make arrangements, the authors who have led us into these concepts may be talked into joining the party and going into the future with us.

And why should we go to so much trouble? Personally, I plan to be around

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

then, and a new book every now and then by my favorite author(s) would greatly improve my lifestyle. Even if they never write another word, just knowing that they made it would satisfy me. After all, who deserves a chance to see the future more than the people who have had so much influence on it? SF authors are not the only people whose continued existence would improve our future. Comedians and scientists come to mind. I would like to see your list of "worth saving," especially if you want to contact them!

As Poul Anderson told so well in *The Ancient Gods*, it is a grievous loss to have our loved ones die once we can see life extension technology becoming widely available. It doesn't take much vision to see that this technology is looming over the horizon right now. Every time we lose another friend, or another old master dies and is lost by cremation or left to decompose in a hole, our future has been made that much less interesting. I want an interesting future, how about you?

H. KEITH HENSON

Cryonics information is available from:
ALCOR Life Extension Foundation
12327 Doherty
Riverside, CA 92503
800-367-2228 (714-738-5569 in CA)

P.S. *Please* don't write me about how we need death to make space for the young. The technology required to repair people will open the whole universe to us, and the solar system alone can support thousands of times the current population.

Interesting ideas for all to think about, but I find your talk about "convincing them to cooperate" more than a little disturbing. That's an extremely personal decision, and I would hate to see our publication of this letter lead to a lot of badgering letters to favorite authors (or anyone else). In most cases it's reasonable to assume that they know about the possibilities—and if they choose, for whatever reasons, not to take personal action on them, that's nobody's business but theirs.

As for your P.S., I suspect you'd better expect some letters anyway! Even assuming that the whole universe is *open to us (which is far from proved, since there may be other factors involved than just human cell repair), you gloss rather lightly over the logistical problems of getting a growing population distributed through the available space at a rate commensurate with the rate of growth. And it's debatable just how desirable a universe brimful of human beings is, for anybody except that subset of humans who like that sort of thing!*

Dear Stanley,

It does not compute. I don't believe that your "invented" language is your inner language. I suspect that your invention is a more logical rendering of conscious ideas in your mind, and an improvement on our current languages.

However, several things lead me to believe that your "Brain Language" editorial of March, 1987, is poorly thought out and not logically scrutinized.

In the first place, our brains function much faster than you could possibly express. At best, your invented language might be a coded shorthand of your conscious thoughts.

Consider, secondly, that your language is expressed in a recognizable context. Are your words expressed left to right and top of page down? Your language is too common. A truly unusual language would not necessarily be lines on paper. How about colors or light pulses?

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Thirdly, the fact that your invented language is non-Indo-European in structure may be only a deliberate (albeit unconscious) negation.

In the fourth place, if our "translators" are programmed to translate into socially useful words or concepts, then your "translator" is *still* so programmed. Your language is undeniably contaminated.

Our programming language, regardless of how many levels or steps exist, was learned while we were experiencing the world tactilely and emotionally. Perhaps memory is hormonal?

I suspect that individual learning abilities are more the result of childhood emotional intercourse than *anything* else. Did we learn language from a desire to please, either joyfully or under duress? Emotional withdrawal or anger would stunt a desire to learn. One way in which we are all alike is that we have emotional responses. We differ in our responses.

Greater emphasis on the emotional incentives that result in strong desires to learn, and why people, emotionally, react differently to apparently similar patterns of teaching and discipline, would be more interestng than "endolinguistics".

I suspect that the relationship of a mother to father and other emotional contacts, as well as the relationship of child to parent is of far greater import than *vain* attempts to find the "private languages."

Without chemical or other physical damage to our brains' matter, we all have the same potential for learning. We are all the same species, possible from a common ancestor, and a very unique form of life.

TERRY MULCAHY

Albuquerque, NM

For someone who opens his remarks by attacking someone else's speculations as "poorly thought out and not logically scrutinized," you seem remarkably casual about making assumptions and accepting them with no testing—such as that attempts to look for internal languages are necessarily "vain," or that "we all have the same potential for learning" despite easily verifiable anatomical and physiological differences among individual brains.

Anyway . . . of course the language I described is "contaminated"; I'm consciously aware of some outside influences, particularly in the matter of conscious choices of vocabulary. (I never claimed that it was *my "internal language," but rather wondered whether it might be "a version of" that. Maybe I should have said "closely derived from . . . ") Yes, I made up words, and I chose to write them in a version of the alphabet I was most familiar with; none of this has anything to do with the underlying structure. Several widely spoken languages have at different times been written in different alphabets, but that did not make the different versions different languages—the orthography is just a representation, not the language itself. (Your suggestion about "colors or light pulses," by the way, strikes me as quite far-fetched since people aren't equipped to deal in such things. Lightning bugs, yes; people, no.) And who said I was looking for "a truly unusual language," anyway? The kind of thing I was describing, if it exists, ought to have recognizable similarities to most languages in actual use. But the actual* words *used are relatively unimportant. Take a look at* Scientific American*'s article of a few years ago on "Creole Languages," which have evolved in many places with unrelated vocabularies but remarkably similar grammars. And the next letter . . .*

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Dear Stan,

I am very much intrigued by your editorial on endolinguistics in the March '87 *Analog*, and I would like to make a suggestion which, even if it isn't taken seriously, may at least contain the germ of an SF story.

If we take it as given that each individual develops his own personal language, we still have to determine to what degree these vary from each other and from the spoken languages we learn later. Might it not be interesting to publish excerpts in, for example, your own personal language in order to find out whether it might just possibly be understandable to some other individual?

A crazy notion? Perhaps, but there'd be no harm trying.

REGINALD BRETNOR

Medford, OR

Quite so, and it is an interesting notion. I'll be very surprised if anything comes of it, since even somebody with a very similar internal language would very likely choose different symbols (spelling conventions and words) to externalize it, but I'm willing to give it a try. A sample paragraph (just composed for this occasion, to illustrate several structural features in a small space) follows. If anybody comes up with a reasonably accurate translation, I'll confirm the fact privately and announce it publicly. But I won't *publish a translation or give any further clues—it's just too handy having an easily usable language that's as opaque to other people as I suspect this one is!*

O li po vmalan ona kado li v abego na amiki. De pate ni li v roma a ni goi pre onga ni ka u bakona pa tai nini goi. Amiki a o ona kama atu li frena u kala hoi i luna ka ingua. O sili wa jua lakin amiki sega kama ma lime hoi keb dogo i na he bruni pocti goda okqt jua siki pende. Ma li peso kama wa lita ni hota ni ge v abego keda. Wa axor li anza ku k pota bele a abego waka. Amiki a o o li suje ni e k nuba a ma goi. O ma li ju du tyari swali ma o ka oho sega. Ni li u pota dere ingua wa axor ki et bele inga ni ka v atu a o inga ni ka vek triba.

Dear Stan,

Your March editorial on "Brain Language" brought to mind an article I read some time ago titled "Creole Languages," by Derek Bickerton in the July 1983 *Scientific American*. Bickerton discusses the development of Creole languages in areas where colonial powers imported large numbers of agricultural workers who spoke a wide variety of languages, using Hawaii as his example. To communicate among themselves, the immigrants invented a makeshift language, or pidgin, in the case of Hawaii based on English. Pidgin has a quite rudimentary structure, and lacks many useful features of native languages; word order varies widely from speaker to speaker. The only common language that the children of these immigrants encountered was pidgin, with its inconsistent structure. In one generation, they expanded pidgin into a "Creole" language. The "Creole" language borrows pidgin's English-based vocabulary, but has a fully-developed grammar, consistent from speaker to speaker.

The Creole grammatical structure shows numerous differences from the structure of English and the other languages that the immigrants' children grew up hearing, such as Hawaiian, Chinese, Japanese, Portuguese, Ilocano, and Tagalog. However, the grammatical structure is very similar to the structures of the Creole languages of other parts of the world. These Creoles developed independently, and use vocabularies based on several different

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

languages, including English in Hawaii, Jamaica, and New Guinea, French in Haiti and Mauritius, and Portuguese in the Cape Verde Islands.

From this similarity among Creole languages, Bickerton hypothesizes that children are born with an innate grammar, consistent from child to child. Children learn to suppress this grammar as they learn a language. In learning pidgin, which has no consistent grammar, the children of the immigrants retained their innate grammar. A Creole language then combines a variable vocabulary with a "hard-wired" structure.

Bickerton goes on to discuss children learning English. Where English grammar differs from Creole grammar, children make systematic errors. In contrast, they readily learn subtle grammatical distinctions in cases where English and Creole are similar.

Perhaps the inner language you discussed is structured by this innate grammar, at least at its highest levels. This would suggest that individual internal languages are quite similar in some respects throughout the species. Using the machine analogy, our brain seems to include as standard equipment an incomplete compiler in ROM. This incomplete compiler fully defines a grammar, but the user must supply his own vocabulary for a symbol table. In learning to speak English, children use the ROM program until they program a new English compiler for themselves. The built-in compiler could very well be used in translating between lower and higher levels of internal language even after external language is fully learned.

I doubt that there is an innate vocabulary that is also suppressed in learning language. There is some evidence that children must learn a language at an early age to ever be able to learn a language at all. The development of a private high-level language is probably dependent on outside stimulation, unlike the growth of teeth and hair. The association of specific words with specific objects and abstractions seems to be the crucial point in learning language—the grammar can evidently be filled in by instinct.

On the other hand, perhaps toddlers do attach meanings to their nonsense words, and the crucial learning step is to associate private words with other people's words. It would certainly be an interesting, if ethically impossible, experiment to isolate pairs of infants to see if they developed languages with randomly chosen words and a consistent grammar.

Does your private language that invented itself have a grammar similar to that of Creole languages? If that in fact turns out to be the structure of most individual inner languages, your cultural transplant cure for low intelligence could be prescribed as an extended vacation to Hawaii or Jamaica.

WILLIAM MILLS

Virginia Beach, VA

The language I mentioned has some, though not all, of the common Creole features. I could be persuaded to spend some time in Hawaii or Jamaica investigating further. . . . ■

A man can stand almost anything except a succession of ordinary days.

Goethe

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

a calendar of analog upcoming events

29 October - 1 November
13th WORLD FANTASY CONVENTION at Hyatt Regency, Nashville, Tenn. Guest of Honor—Piers Anthony, Frank Kelly Freas, Karl Edward Wagner, Ron & Val Lakey Lindahn, MC—Charles L. Grant. Registration—supporting $25, attending $50. NO memberships sold at the door; limited attendance. Info: 13th World Fantasy Convention, Box 22817, Nashville TN 37202.

30 October - 1 November
PUMP-KON 1 (Mixed media/genre convention) at Holiday Inn, Somerville, Mass. A mixture of gothic, horror, mysticism, SF, Fantasy, spiritualism, media. Registration —$25 until 1 October, $30 at the door ($15 for children 5-12). Info: Alternative Factor, limited, Box 3437, J.W. McCormack Sta., Boston MA 02101.

1 - 5 November
Third International Laser Science Conference at Atlantic City, N.J. Info: A.P.S., 335 East 45th Street, New York, NY 10017.

7 November
NOT-SO-ITTYBITTYCON (Star Trek conference) at Texas A&M, College Station, Tex. Guest—Gene Roddenberry. Info: MSC Cepheid Variable, Box J-1, Memorial Student Center Texas A&M University, College Station TX 77844. (409) 845-1515.

7 - 8 November
BASH '87 (Boston area Star Trek convention) at Hyatt Regency Hotel, Boston, Mass. Registration—$13.50/day, $25/weekend until 30 September, $17/day $30/weekend at the door. Info: The BASH '87, Box 6838, Broad and Water Post Office, Boston MA 02102.

13 - 15 November
PHILCON 87 (51st Annual Philadelphia SF conference) at Adam's Mark Hotel, Philadelphia, Penna. Registration—$15 until 1 November, $20 at the door. Info: Philcon, Box 8303, Philadelphia PA 19101.

13 - 15 November
EARTHCON IV (multi-media convention) at Holiday Inn Westlake, Cleveland, Ohio. Fan Guest of Honor—Jim Young. Registration—$18 until 31 August, $22 thereafter. Information: Earthcon IV, Box 5641, Cleveland OH 44101. (include S.A.S.E.)

13 - 15 November
DALLAS FANTASY FAIR (media-oriented conference) at Dallas, Tex. Tickets—$20 for three days until 1 November, $25 at the door. Info: Bulldog Productions, Box 820488, Dallas TX 75382. (214) 349-3367.

20 - 22 November
SMOFCON IV (Convention for convention organizers and managers) at Quality Inn, Columbus, Ohio. Registration $35. The emphasis and theme of this con will be "Regional Conventions." Info: FANACO, Inc., % Liz Gross, 376 Colonial Avenue, Worthington OH 43085. 1 - 5 September 1988 NOLACON II (46th World Science Fiction Convention) at Sheraton Hotel & Towers, Marriott Hotel, Rivergate Convention Center, New Orleans, La. Guest of Honor—Donald A. Wollheim, Fan Guest of Honor—Roger Sims TM—Mike Resnick. Registration —Attending $60 until 31 December 1987, $70 to 10 July 1988. Supporting—$30. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition, the works. Join now and get to nominate and vote for the Hugo awards and the John W. Campbell Award for Best New Writer. Info: Nolacon II, 921 Canal Street #831, New Orleans LA 70112 (504) 525-6008.

—Anthony Lewis

Items for the Calendar should be sent to the Editorial Offices six months in advance of the event.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

TAKE ANY 5 BOOKS FOR $1
WITH MEMBERSHIP.

SEE OTHER SIDE FOR ADDITIONAL SELECTIONS.

2451 Spec. ed. ▲
Club ed. $8.98

★ 3238 Pub ed. $19.95
Club ed. $9.98

3558 Pub ed. $17.95
Club ed. $4.98

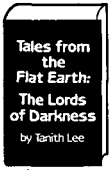
2733 Pub ed. $18.95
Club ed. $6.98

3673 Pub ed. $19.95
Club ed. $7.98

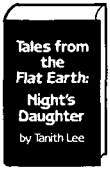
3475 Pub ed. $15.95
Club ed. $4.98

3426 Pub ed. $18.95
Club ed. $6.50

★ 3442 Pub ed. $17.95
Club ed. $5.98



★ 3731 Night's Master; Death's Master; Delusion's Master. Spec. ed. ▲
Club ed. $8.98



★ 3715 Delirium's Mistress; Night's Sorceries. Spec. ed. ▲
Club ed. $7.98

3418 The Ladies of Mandrigyn; The Witches of Wenshar.
Spec. ed. ▲
Club ed. $7.50

5520 The Sleeping Dragon; The Sword and the Chain; The Silver Crown.
Spec. ed. ▲
Club ed. $8.98

★ 2345 The Moment of the Magician; The Paths of the Perambulator; The Time of the Transference.
Spec. ed. ▲
Club ed. $7.98

0992 Dragonsong; Dragonsinger; Dragondrums. Comb. pub. ed. $38.85
Club ed. $7.98

▲ Exclusive hardcover edition.
★ Explicit scenes and/or language may be offensive to some.

How the Club Works: You'll receive your 5 books for only $1 (plus shipping and handling) after your application for membership is accepted. We reserve the right to reject any application. However, once accepted as a member, you may examine the books in your home and, if not completely satisfied, return them within 10 days at Club expense. Your membership will be cancelled and you'll owe nothing.

About every 4 weeks (14 times a year), we'll send you the Club's bulletin, *Things to Come*, describing the 2 coming Selections and a variety of Alternate choices. In addition, up to 4 times a year you may receive offers of special Selections, always at low Club prices. If you want the 2 Selections, you need do nothing; they'll be shipped automatically.

If you don't want a Selection, prefer an Alternate or no book at all, just fill out the convenient form always provided and return it to us by the date specified.

We allow you at least 10 days for making your decision. If you do not receive the form in time to respond within 10 days and receive an unwanted Selection, you may return it at our expense.

As a member you need buy only 4 books at regular low Club prices during the coming year. You may resign any time thereafter or continue to enjoy Club benefits for as long as you wish. One of the 2 Selections each month is only $4.98. Other Selections are higher, but always much less than hardcover publishers' editions—UP TO 65% OFF. The Club offers more than 400 books to choose from. Each volume printed on our special presses is produced on high-quality acid-free paper. A shipping and handling charge is added to all shipments. Send no money now, but do mail the coupon today!

SCIENCE FICTION BOOK CLUB®

Dept. CS-534, Garden City, NY 11535

I want the best SF in or out of this world! Please accept my application for membership in the Science Fiction Book Club. Send me the 5 books I have numbered in the boxes below, and bill me just $1 (plus shipping and handling). I agree to the Club Plan as described in this ad. I will take 4 more books at regular low Club prices in the coming year and may resign any time thereafter. SFBC offers serious works for mature readers.

1.	2.	3.	4.	5.

Mr.
Ms. _____
(Please print)

Address _____ Apt. # _____

City _____

State _____ Zip _____

If under 18, parent must sign. _____

The Science Fiction Book Club offers its own complete hardbound editions sometimes altered in size to fit special presses and save you even more. Members accepted in U.S.A. and Canada only. Canadian members will be serviced from Canada. Offer slightly different in Canada. 38-S054

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

WARNING:

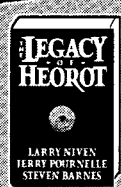
The Science Fiction Book Club is habit forming. May cause severe sleep deprivation. Also known to stimulate inordinate curiosity about non-human creatures and recurring desire for inter-dimensional travel.

SCIENCE FICTION BOOK CLUB®

3350 Pub ed: $19.95
Club ed: $6.98

1743 Pub ed: $16.95
Club ed: $5.98

3160 Pub ed: $16.95
Club ed: $5.98

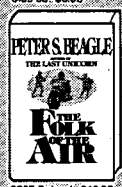


3566 Pub ed: $17.95
Club ed: $5.98

★ **3491** Spec. ed. ▲
Club ed: $4.98

2519 Pub ed: $15.95
Club ed: $6.98

1362 Pub ed: $14.95
Club ed: $5.98



3665 Pub ed: $16.95
Club ed: $5.50

3657 Pub ed: $16.95
Club ed: $4.98

3723 Pub ed: $16.95
Club ed: $4.98

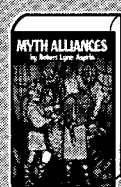
†**3541** Spec. ed. ▲
Club ed: $5.98

★ **3384** Pub ed: $15.95
Club ed: $4.98

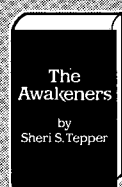
0752 Elric of Melnibone; The Sailor on the Seas of Fate; The Weird of the White Wolf. Spec. ed. ▲
Club ed: $6.98

1172 The Vanishing Tower; The Bane of the Black Sword; Stormbringer. Spec. ed. ▲
Club ed: $7.98

1420 Includes the First, Second and Third Books. Spec. ed. ▲
Club ed: $7.98



3509 Myth-ing Persons; Little Myth Marker; M.Y.T.H. Inc. Link. Spec. ed. ▲
Club ed: $6.98



3540 The Awakeners: Northshore; The Awakeners: Southshore. Comb. pub. ed: $30.90
Club ed: $6.98

0075 The First 5 Amber Novels. 2 vols. Comb. pub. ed: $32.30
Club ed: $8.98

TAKE ANY 5 BOOKS FOR $1

WITH MEMBERSHIP.

SEE OTHER SIDE FOR ADDITIONAL SELECTIONS.

SCIENCE FICTION BOOK CLUB®

38-S054

†Copyright © 1986 Paramount Pictures Corporation All Rights Reserved
STAR TREK is a Registered Trademark of Paramount Pictures Corporation

▲ Exclusive hardcover edition.
★ Explicit scenes and/or language may be offensive to some.

LICENSED TO UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED